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AND

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THE BRITISH ASSOCIATION. EIGHTH MEETING: NEWCASTLE.

WE have usually begun our notice of these meetings by journalising a little of our progress towards them; but for this, the *Eighth Anniversary*, the transit being by the Ocean steamer, in rather a tumbling sea, there occurred little worthy of being specifically noticed. The vessel had its fair freight of literary and scientific passengers, including Miss Martineau, Mr. G. R. Porter, Dr. Bowring, Capt. Washington, Professor Wheatstone, Mr. Babbington (Botanist), Dr. Morren (Professor of Botany, Liege), Mr. Owen (Surgeons' Hall), Mr. R. Taylor, Dr. Granville, Mr. Jones (King's College), Mr. G. W. Hall, Gen. Briggs, Capt. Percy Grace, Col. Reid, Chev. Basslé, and his interesting son, M. Gustave Adolphe Basslé, whose extraordinary mnemonic powers have attracted so much notice in London.

On Saturday we found all the previous arrangements made in a very satisfactory manner. At the Town Hall the necessary tickets, and at the Colonnade Reception Rooms every kind of information as to lodgings, and other matters so essential to the comfort of strangers, were readily obtained. In other respects the inhabitants of Newcastle appeared to be vying with Dublin itself in the rites of hospitality, and private individuals were lavishing every attention and kindness on parties almost unknown to them.

This gave fair promise of an agreeable week; which, up to the period of our writing, has not been disappointed.

The general committee met at one o'clock in the Grand Jury Room and discussed preliminary objects of no public consequence, except as concerned the internal regulation of the Association, of which this body is the parliament.

At six o'clock, about fifty or sixty of the members who had arrived, dined together at the ordinary in the Turk's Head, with Mr. Taylor (one of the Secretaries) presiding: Professor Sedgwick, Mr. Greenough, Col. Sykes, Mr. Hope, Major Sabine, Mr. Bache (grandson of Franklin), Sir W. Hamilton, Professor Robinson (Armagh), and other eminent persons were of the party, which, after some complimentary toasts, separated at an early hour.

Sunday was, of course, a day of rest; but a number of arrivals took place: and on Monday morning, the various places of resort exhibited much bustle and activity; issuing tickets, answering inquiries, making the sectional distribution of papers, and other matters which always occasion some little stir. The streets and the entrances to the places appointed for meetings were a good deal crowded, and considerable curiosity seemed to be felt by the local population.

The following order of proceedings was promulgated:—

"Sectional Meetings.—The Sections will assemble every day during the week (Saturday excepted), at eleven o'clock, in the following places.

- Section A. Mathematics and Physics—Lecture-Room of the Literary and Philosophical Society.
- B. Chemistry and Mineralogy—County Court.
- C. Geology and Geography—Music Hall.
- D. Zoology and Botany—County Court.
- E. Medical Science—Surgeons' Hall.
- F. Statistics—Old Academy of Arts.
- G. Mechanical Science—Music Hall.

The committee of each section will meet daily at ten A.M., in rooms adjacent to the respective section rooms. The communications to each section will be taken in a settled order, as previously fixed by the secretaries, and made public by notice at the inquiry-room, Savings' Bank, Arcade, in the Library of the Literary and Philosophical Society, and at the entrance of each section-room.

The model-room will be open during the whole week of the meeting from eight A.M. to five P.M. A person will be in attendance to give explanations.

Ladies' morning tickets will admit them to the sections A, B, C, and G, and to the model-room, &c.

Evening Meetings (at 8 P.M.)

On Monday evening, the first general meeting of the Association will be held in the Central Exchange; when the Duke of Northumberland, the president elect, will take the chair, and the address of the general secretaries will be read.

On Tuesday evening, the attention of the meeting will be called to the collection of models in the exhibition-room; and the objects in forming such a collection will be pointed out, and some of the models explained by several members of the Association.

On Wednesday evening, the Green Market will be opened for promenade, conversation, and refreshments.

On Thursday evening, the president, or other officers of the sections, will read Abstracts of the Proceedings that have taken place in their respective sections.

On Friday evening, the suite of Assembly Rooms (enlarged for the occasion) will be opened for promenade, conversation, and refreshments.

On Saturday evening, the Concluding General Meeting of the Association will take place, when the president, or the officers of the sections, will read Abstracts of the further Proceedings of the Sections; and when the proceedings of the general committee, and the grounds of the several grants of money that have been sanctioned by them, will be explained."

And the annexed list of places and objects to which members would be admitted on producing their tickets, was issued with the general programme:—

"General News Rooms.—Exchange, Sandhill; and Assembly Rooms, Westgate Street.

Institutions.—Literary and Philosophical and Natural History Societies, open every day, and lighted with gas in the evening; Antiquarian Society, where the librarian will attend to explain the collection of Roman antiquities; St. Nicholas's Church and Thomlinson's Library; the Rooms of the Literary, Scientific, and Mechanical Institution, Blackett Street; the Exhibition Rooms of the Northern Academy for the Promotion of the Fine Arts; Exhibitions of Models, and Specimens of National Industry, entrance from Market Street.

Manufactories.—Flint Glass—the Northumberland Glass Company, Skinner-burn; Mr. Price's Glass Works, Gateshead. Window Glass—Broad and Crown Glass Works, Glasgous Bridge; Messrs. Richardson and Co. St. Peter's Quay. Iron and Alkali Works at Walker—Messrs. Losh, Wilson, and Bell, Wednesday and Friday during the week of meeting. Chemical Works at Low Felling—Messrs. J. Lee and Co. (application to be made at the Office in the Close). Iron Works, Gateshead—Messrs. Hawks, Stanley, and Co. Steam Engines—Messrs. Robert Stephenson and Co., South Street, any day during the week of meeting except Saturday, between the hours of ten and twelve, and one and three—Messrs. R. and W. Hawthorn, Forth Banks. Lead Works—Messrs. Locke, Blackett and Co., Gallowgate. Messrs. Atwood and Co.'s vaucloughs, St. Anthony's.

Pottery.—Messrs. Sewell and Donkin, St. Anthony's.

Roperies.—Mr. Joseph Crawhall, St. Ann's—Messrs. Chapman and Potts, Willington—Messrs. D. Haggie and Son, South Shore, Gateshead.

Copperas.—Messrs. Stanton and Co., Elswick.

Salt Mill.—Mr. Wm. Clayton, Skinner-burn, at any time after one o'clock on Wednesday and Thursday, the 22d and 23d of August.

Geological Excursions.—To Tynemouth, Cullercoats, and Whitley, on Friday, the 25th (apply to the committee of the Geological Section.) Basaltic Dyke, at Coaly Hill and Dewley Burn, four miles north-west of Newcastle. Basaltic Dyke in Walbottle Dean, four miles west of Newcastle. The Lead Mines of T. W. Beaumont, Esq. Allenheads. (The directors of the Newcastle and Carlisle railway will convey parties to the nearest point to the mines, and bring them back free of expense, application to be made to Mr. Adamson, local secretary.)

Collieries.—Various collieries may be visited by application to the owners and managers, through the Geological Section.

Railways.—The Carlisle and North Shields—the Durham Junction Railway and Bridge over the river Wear near Lambton, to the opening of which an excursion will

be made on Friday, the 28th (apply to the committee of the Mechanical Section).

Members of the Association requiring introductions, information, or assistance in any way, are requested to apply to members of the Reception Committee, some of whom will be found distinguished by a red ribbon in the button-hole, in the Inquiry-Room, and all other rooms used during the meeting."

It will be seen from this, that, independently of the business of the Association, there has been more than enough of instructive and gratifying occupation sketched out for the members, if they had almost as many weeks as they have days to spend among the good folks of Newcastle.

On Monday, the various sections assembled more punctually, and with less confusion than we remember to have witnessed at any former meeting; indeed, without confusion, ought to be the phrase—a circumstance which reflects great credit on the previous exertions of the local committees, and Mr. Phillips, to whom the Society is always under so much obligation for his superintending diligence.

As if led by the alphabet, we attended Section A. (Mathematics and Physics), where Sir John Herschel took the chair, and shortly addressed the assembly, which filled the entire lecture-room.

SECTION A.—Mathematics and Physics.

President—Sir J. F. W. Herschel, Bart., F.R.S. Vice-Presidents—Francis Baily, Esq., F.R.S., Sir David Brewster, K.H., Sir William Rowan Hamilton, K.H., Rev. Dr. Robinson. Secretaries—Rev. Professor Chevallier, Major Sabine, R.A. F.R.S., Rev. Professor Stevelly. Committee—Professor Bache, of Philadelphia; Professor Forbes, F.R.S., William Snow Harris, Esq., F.R.S., Major Jervis, Captain Edward Johnson, R.N., Rev. Professor H. Lloyd, F.R.S., Professor MacCullagh, Professor Nichol, Rev. Professor Pencock, F.R.S., Lieut.-Col. Reid, Capt. James C. Ross, R.N., F.R.S., John Russell, Esq., Edinburgh; John Fox Talbot, Esq., Rev. William Turner, Jun., Professor Wheatstone, F.R.S., Rev. W. Whewell, Rev. Professor Whitley, Professor Van Galen, Rotterdam.

The business commenced by the reading of a short paper 'On Storms,' by Lieut.-Col. Reid, of the Engineers, with occasional comments, *viva voce*, in which he brought forward and unfolded one of those subjects which will make the meetings of the British Association memorable in the annals of science. Its importance in every point of view cannot be overrated; though the gallant Colonel, with a modesty so honourable to really original and extraordinary efforts in a walk hitherto neglected, though bearing so much upon the interests of mankind, liberally attributed much of its merit to Mr. Redfield, an American, who had first called his attention to it, and made light of his own labours in collecting a volume of facts with an industry and zeal above all praise. The colonel observed that he broached no theory, but had brought these data together, to lay them before the able men whom he was sure to meet at this assembly.

'A Report, explaining the Progress made towards developing the Law of Storms; and a Statement of what seems further desirable to be done to advance our Knowledge of the Subject.' By Lieut.-Col. W. Reid, Royal Engineers. "Having been ordered, in the course of military duty, to the West Indies in 1831, I arrived at Barbadoes immediately after the great hurricane of that year, which, in the short space of seven hours, killed upwards of

1400 persons on that island alone. I was for two years and a half daily employed as an engineer officer amidst the ruined buildings, and was thus naturally led to the consideration of the phenomena of hurricanes, and earnestly sought for every species of information which could give a clue to explain it. The first reasonable explanation met with was a small pamphlet extracted from the 'American Journal of Science,' written by W. C. Redfield, of New York. The gradual progress made in our acquaintance with the subject of storms is not uninteresting. The north-east storms on the coast of the United States of America had attracted the attention of Franklin. One of these storms preventing his observing an eclipse of the moon at Philadelphia, he was much surprised to find that the eclipse had been visible at Boston, which town is north-east of Philadelphia. This was a circumstance not to be lost to such an inquiring mind as Franklin's. By examination he ascertained that the north-east storm came from the south-west: but he died before he had made the next step in this investigation. Colonel Capper, of the East India Company's service, after having studied meteorological subjects for twenty years in the Madras territory, wrote a work on the winds and monsoons in 1801. He states his belief that hurricanes will be found to be great whirlwinds; and that the place of a ship in these whirlwinds may be ascertained: for the nearer to the vortex, the faster will the wind veer, and subsequent inquiries have proved that Colonel Capper was right in his opinion. Mr. Redfield, following up the observations of Franklin, probably without knowing those of Colonel Capper, ascertained that, whilst the north-east storms were blowing on the shore of America, the wind, with equal violence, was blowing a south-west storm in the Atlantic. Tracking Franklin's storms from the southward, he found, throughout their course, that the wind in opposite sides blew in opposite directions; and that, in fact, they were whirlwinds, their manner of revolving being always in the same direction. By combining observations on the barometer with the progressive movement of storms, Mr. Redfield appears to have given the first satisfactory explanation of its rise and fall in stormy weather, and my inquiries confirm his views. The first step taken by me in furtherance of the inquiry, was to project maps on a large scale, in order to lay down Mr. Redfield's observations, and thus to be better able to form a judgment on the mode of action of the atmosphere. These maps, which have been now engraved for publication, are the Charts I. and II.* of those laid before the Association. The wind is marked by arrows; on the right hand of the circles the arrows will be observed to be flying from the south; on the left hand, coming back from the north. The field of inquiry which this opens can be but simply indicated here: to proceed in a satisfactory manner with the study, it being a new one, requires that the proofs be exhibited step by step; this I have done by printing what I have collected and arranged. The inferences drawn from the facts appear very important, and the further pursuit of the inquiry well deserving the attention of abler men than myself. The manner in which I followed up the investigation has been to procure copies of the actual log-books of ships, to combine their information with all that I could obtain on land, and thus

compare simultaneous observations over extended tracks. On Chart VII. are thirty-five ships in the same storm, the tracks of several crossing the storm's path, and the wind as reported by the ships, corroborated by the report from the land. The observations of ships possess this great advantage for meteorological research, that merchant log-books report the weather every two hours, and the log-books of ships of war have hourly observations always kept up. After having a variety of storms in north latitude, I was struck with the apparent regularity with which they appear to pass to the North Pole, and therefore led to conclude that, in accordance with the order of nature, storms in south latitude would be found to revolve in a precisely contrary direction to that which they take in the northern hemisphere. I earnestly sought for facts to ascertain if this were really the case; and I had obtained much information to confirm the truth of it, before I was at all aware that Mr. Redfield had conjectured the same thing, without, however, having himself traced any storms in south latitude. Chart VIII. represents the course of a very severe hurricane, encountered by the East India fleet under convoy in 1809, and it is strikingly illustrative of the truth of this important fact. If storms obey fixed laws, and we can ascertain what those laws are, the knowledge must be useful to navigation; but to apply the principles practically, requires that seamen should study and understand them. The problem so long desired to be solved, viz. on which side to lay-to a ship in a storm, I trust is now explained. By watching the veering of the wind, the direction in which a storm is falling may be ascertained. The object required is, that the wind, in veering, should bear aft instead of ahead, that a vessel may come up instead of having to break off. To accomplish this, the ship must be laid on opposite tacks, on opposite sides of a storm; but the limits of this paper render it impossible to attempt an explanation in detail. The researches which have been carried into the southern hemisphere, afford a very interesting explanation to the observations of Captain King in his sailing directions for the southern extremity of America, viz. that the rise and fall of the barometer in southern gales corresponds with the rise and fall in high northern latitudes; east and west remaining the same, but north and south changing places. This is a strong corroboration of what I trust I have now proved. Five connected storms, which occurred in 1837, and followed each other in close succession, possess an interest altogether new, for they afford us a clue towards explaining the variable winds. Since these whirlwinds revolve by an invariable law, and always in the same direction, every new storm changes the wind. Thus the hurricane of the middle of August 1837, traced on Chart VII., had hardly passed towards the Azores with the wind in the southern portion of it, blowing violently at the west, when another storm, coming from the south, and bringing up the ship Castries with it, at the rate of seven or eight knots an hour, reversed the wind to east. The storms, expanding in size and diminishing in force as they proceed towards the poles, and the meridians at the same time approaching each other, gales become huddled together, and hence, apparently, the true cause of the very complicated nature of the winds in the latitude of our own country. Since great storms in high latitudes, often extending over a circular space of one thousand miles, the length and breadth of the British Islands afford far too limited a sphere for

their study; and this is the chief reason which induces me to presume to address this society. Nations should unite to study the atmospheric laws. By exchanging the observations made at the light-houses of different countries, reports would be obtained along the whole coast of the civilised world. If the merchant log-books, instead of being destroyed, as they frequently are at present, were preserved in *dépôts*, each great commercial port keeping its own, they would greatly assist in giving observations upon the sea, and along the coasts. After the same manner, the meteorological reports within the interior of different nations should be exchanged, and we should then soon be able to trace the tracks of storms over almost the entire globe. When I had obtained satisfactory proofs that storms in the southern hemisphere revolve in the opposite direction to that which they take in the northern, and saw the magnet, when in conjunction with the Voltaic battery, exhibit a similar phenomenon, making contrary revolutions on the two poles, it gave again a novel and increased interest to the inquiry. I have since, with the assistance of Mr. Clarke, of the Lowther Arcade (with whom I placed an 84 lb. hollow shot for the purpose of experiment), found that rotations may also be exhibited off the poles; but I have not yet had time to try further experiments with this shot, fitted up after the manner of Barlow's magnetic globes. During this investigation, I have also endeavoured to ascertain the law by which water-spouts move; for they, doubtless, follow some fixed law. After many fruitless researches, I have obtained two instances; one of which is from Captain Beechey; where there appears no reason to doubt that the explanations given are correct. It is remarkable that, in these two examples, which occur in opposite hemispheres, the revolutions are in opposite directions, but both in the contrary direction to great storms. The double cones in a water-spout, one pointing upwards from the sea, the other downwards from the clouds, mark it as a phenomenon of another kind; and we ought to observe whether the cloud above and the sea below revolve in the same directions with each other. To ascertain their electrical states would be also highly interesting; and this may not be impracticable, since the great hydrographer Horsburgh actually put his ship through small phenomena of this description (when navigating the Indian Ocean); and this step he hazarded for the purpose of examining their nature. The apparent accordance of the force of storms with the law of magnetic intensity, as exhibited by Major Sabine's report to this Society, is also very remarkable; and I had looked forward to its being printed with great interest, in order to make the comparison. It is frequently remarked, with wonder, that no storms occur at St. Helena. I felt, therefore, much curiosity to know the degree of magnetic intensity there, and was not a little struck at finding it the lowest yet ascertained on the globe. Major Sabine's isodynamic lines, to express less than unity, are only there, and they appear, as it were, to mark the true Pacific Ocean of the world. The lines of greatest intensity, on the contrary, seem to correspond with the latitudes of typhoons and hurricanes; for we find the meridian of the American magnetic pole passing not far from the Caribbean Sea, and that of the Siberian Pole through the China Sea. To the charts I have annexed an engraving of a meteorological table, as registered at Birmingham, by Mr. Osler's anemometer, and endeavoured to make better known the successful

* Of course we can only refer to these diagrams, &c.; but as the subject must occupy much future inquiry and discussion, we shall have opportunities of adding to and explaining what may be obscure.—Ed. L. G.

efforts of Mr. Whewell and Mr. Osler, to measure the wind's force. It is very desirable that these beautiful instruments should be placed beyond the limits of our own islands, particularly in the West Indies and at the Cape of Good Hope, where they may measure the force of such a storm as no canvass can withstand—that which reduces a ship to bare poles. It is not only to measure the wind's greatest force that it is desirable to multiply these anemometers, and place them in various localities, but that we may endeavour, by their means, to learn something more definitive regarding the gusts and squalls of wind which always occur in great storms."

The paper was heard throughout with much applause, and at its close the same sentiment was loudly expressed. Our readers may form a very familiar idea of the subject, by causing the water to circulate in a basin, which will represent the violent circular motion of the storm-wind, with a calm in the centre of the vortex. Suppose this to be also moving onward, at no greater rate than about seven miles an hour, and you have the correct notion of the result of Col. Reid's observation. Near the equator the law is more constant; but when a succession of storms reach northern or southern latitudes beyond the tropics (as where we are placed), their mixture and interference is the cause of our more variable winds.

It is remarkable, that water-spouts, in both hemispheres, obey altogether opposite laws, and that their gyrations proceed in directly opposite directions to the gyrations of the storm.

Professor Bache addressed the meeting; and (after complimenting Col. Reid on the handsome manner in which he had attributed so much praise to his countryman, Mr. Redfield, while he might have so justly appropriated it to himself), stated that Mr. Redfield's opinions had been controverted by Mr. Epsy of Philadelphia, whose papers were published in the American "Philosophical Transactions," and those of the Franklin Institute. Mr. Epsy held that storms were created by winds blowing in to a centre made by condensation of the atmosphere; and he, Mr. Bache, had himself surveyed the course of a land tornado, in which all trees, buildings, &c. had fallen inwards, as if this were the true exposition of the phenomenon. From the centre he presumed that the air rushed upwards; and thus the tempest continued.

Professor Stevelling explained his views, and compared the motion of the aerial phenomenon to that of water running out of a tub, in the bottom of which a small hole was made.

Sir John Herschel spoke highly in commendation of Col. Reid's paper, and of the important consequences to which the further investigation of the subject and the accumulation of data must lead. He illustrated it by an amusing allusion to Franklin, who, when contemptuously asked by a sailor, "What has any landsman ever done in inquiries of this kind?" replied, "Why, they have done one thing; for landsmen invented navigation!" A knowledge of the present subject would teach seamen how to steer their ships, and save thousands of lives. Sir John suggested that the Gulf Stream might be connected with the theory involved in this investigation; and also that the trade winds might throw a light upon the phenomena which it presented. He also alluded to the spots observed on the sun, which, by analogy, might bear upon it, as he considered them, without doubt, to be the upper apertures of great hur-

ricanes passing over the disc of that luminary, the atmosphere moving analogously to our trade winds, and being disturbed by certain causes, precisely as the earth's atmosphere might be.

SECTION B.—Chemistry.

President—Rev. W. Whewell, F.R.S. F.G.S. Vice-Presidents—Dr. T. Thompson, Dr. Daubeny. Secretaries—Professor Miller, H. L. Pattinson, Esq., Thomas Richardson, Esq. Committee—Professor Johnston, Dr. Clanny, Dr. R. D. Thompson, H. H. Watson, Esq., W. West, Esq., F. Zöepfritz, Esq., Dr. Kane, T. Thompson, Esq.

The proceedings in this section were not of much interest on the opening day; and we merely record them at present for the sake of keeping up the connexion; since it would be of little use to occupy space with details which produce no novelty of scientific importance.

Professor Thompson gave the analysis of a new specimen of lead ore; and a gentleman (whose name we did not learn) read a paper 'On the Action of Light on the Nitrate of Silver,' and another 'On the Carbonate of Ammonia.' Mr. Exley, whose experiments on the specific gravities of oxygen, chlorine, &c. are well known, gave an account of many further experiments, all favourable to his theory of attraction and repulsion as the source of action in matter. Another paper was communicated 'On the Composition of the Waters of the Dead Sea,' but various analyses appeared to have afforded various results, and the question was left in an undetermined state.

SECTION C.—Geology.

Mr. Lyell in the Chair.

President for Geology—C. Lyell, Esq. F.R.S. V.P.G.S. Vice-President for Geology—Lord Prudhoe. Vice-Presidents for Geology—W. Buckland, D.D. F.R.S. V.P.G.S., John Buddle, Esq. F.G.S., Richard Griffith, Esq. F.G.S. Vice-President for Geology—Captain Sir J. Buck, R.N. F.R.S. Secretaries for Geology—W. C. Trevelyan, Esq. F.R.S.E. F.G.S., Captain Portlock, R.E. F.R.S. F.G.S., T. Jamieson Torrie, Esq. F.G.S. Secretary for Geology—Captain Washington, R.N. Committee—William Smith, L.L.D., Viscount Cole, F.R.S. F.G.S., Sir Philip Grey Egerton, Bart. F.R.S. F.G.S., R. J. Murchison, Esq. F.R.S. V.P.G.S. Gen. Sec. Rev. Professor Sedgwick, F.R.S. F.G.S., G. B. Greenough, Esq. F.R.S. F.G.S., Count Breunner, Director of the Imperial Mines of Hungary, Marquess of Northampton, F.R.S. F.G.S., H. T. De la Beche, Esq. F.R.S. F.G.S., Professor Phillips, F.R.S., Col. Silvertop, Mar. Jervis, East India Company's Service, Capt. W. Allan, R.N., Capt. J. Ross, R.N., Dr. Richardson, R.N. F.R.S.

Mr. Long read an account of human bones found in a cave at Cheddar, in Somersetshire. The cave is in limestone rock, and the bones were accidentally discovered (from a fox earthing there) in a mud deposit, and mingled with bones of animals hitherto found in similar deposits; such as the ox, deer, horse, and other creatures. From their crumbling to dust when exposed to air, the writer inferred that they were of antediluvian antiquity; but Professor Sedgwick instanced many cases to shew that the inference was not borne out, though he considered the subject to be deserving of further attention.

Mr. Buddle, a coal-viewer of Newcastle, then read the commencement of a valuable paper 'On the Coal Formations in this great Basin,' which he continued on the following day. Till such papers are finished it would be difficult to report them accurately; and we generally find that the first days of the proceedings of the Association are difficult to describe so as to do them justice. Some papers are begun in one section, and the same subject afterwards pursued either there or in other

sections; and till we reach the finale, it is not easy either to explain their bearings, or to say whether their results are of importance, or otherwise. The particulars in this instance, however, are of much consequence, not only to the neighbourhood, but to the country. The question of coal formations in juxtaposition with magnesian strata, and also the means of working them with safety, which this gentleman discussed, must merit much eulogy. We trust to be able to give them altogether in a connected form. The chairman then said this was a section of geography as well as geology, and they could not allow the latter to monopolise the whole of the morning; he would announce, therefore, that the next paper read would be 'Upon the Frozen Soil of Siberia,' by Professor Beare, of St. Petersburg. In the absence of Lord Prudhoe, he would ask Capt. Sir George Back to the chair; this was done, and Captain Washington, secretary for geography, read the paper. It appeared that frozen ground was found in Siberia to the depth of 400 feet, and there was reason to believe that it extended still deeper. A discussion ensued, in which it was strongly recommended that the Hudson's Bay Company should be applied to, to make a series of experiments on the subject. The chairman closed the conversation by stating, that he had no doubt the company would comply with the wishes of such a body as the British Association.

This effort to introduce a little Geography into this Section is well meant; but we fear it will not succeed.

SECTION D.—Zoology and Botany.*

President—Sir W. Jardine, Bart. Vice-Presidents—R. K. Greville, L.L.D., Rev. L. Jenyns, F.L.S., Rev. F. W. Hope, F.R.S. Secretaries—John Edward Gray, Esq. F.L.S. F.B.S., R. Owen, Esq. F.R.S., John Richardson, M.D. F.R.S. Committee—Joshua Alder, Esq., J. Adamson, Esq. F.L.S. &c., C. C. Babington, Esq. M.A., J. E. Bowman, Esq. F.L.S., — Bowman, Esq., W. Backhouse, Esq., Thomas Bell, Esq. F.R.S., Thomas Coulter, M.D., J. H. Fryer, Esq. M.W.S., George T. Fox, Esq. F.L.S., Albany Hancock, Esq., C. Hewitt, Esq., Hon. H. T. Liddell, — Lankester, Esq., Professor Morren, of Liege, Patrick Neill, M.D., George Ord, Esq., R. Parnell, M.D., W. Robertson, Esq., James Ross, Esq. R.N., P. J. Selby, Esq. F.L.S., W. Thompson, Esq. G. Wallis, Esq., T. Teale, Esq., W. C. Trevelyan, Esq., W. Yarrell, Esq.

This section commenced with reading a paper from John Mortimer, Esq. of Aldermanbury, London, on a fish of Surinam, with four eyes. After some discussion, in which many of the learned professors doubted the existence of such a fish, the subject was ordered to be laid aside until the author furnished further information on it. The next paper was 'On the Botany of the Channel Islands,' by C. C. Babbage, Esq. M.A. St. John's College, Cambridge, in which he gave a list of those plants which are natives of the islands of Guernsey and Jersey. The total number of them are about 760, 20 of which had never been gathered in England. The list is curious and interesting to the botanical world. Mr. George Wallis then submitted a specimen of the rare *Psilodogualthus Friendii* (the beetle opena), from the collection of the Natural History Society, found some years ago in the river Magdalena, near to Bogoto de Santa Fe, and made some observations on the habits of the species. John Edward Gray, Esq., one of the secretaries, then entered into a description of some new species of shells found on the coast of Northumberland, and also on some rare shells, and the peculiar nature of the intersected lines upon them. The section did little, and adjourned at an early hour.

* These two ensuing notices are chiefly from the "Tyne Mercury."

SECTION E.—Medical Science.

President—T. E. Headlam, M.D. *Vice-Presidents*—Professor Clerk, M.D. F.G.S., John Fife, Esq., John Yelloley, M.D. F.R.S. *Secretaries*—T. M. Greenhow, Esq., J. A. Vose, M.D. *Committee*—P. W. Roget, M.D. F.R.S., A. B. Granville, M.D. F.R.S., R. S. Sargent, M.D., B. T. Evanson, M.D. M.R.I.A., C. J. B. Williams, M.D., J. C. Pritchard, M.D. F.R.S., John Baird, Esq.,—Lynch, M.D., N. T. Smith, M.D., Wm. Fife, Esq.

A little after the time appointed for meeting, John Yelloley, M.D. F.G.S., one of the vice-presidents of the section, took the chair, in the room of Dr. Headlam, the president, and Mayor of Newcastle, who was unavoidably absent. The chairman said it had fallen on him to preside on the present occasion, and he did so with feelings of great satisfaction, being himself an old Northumbrian. He had long looked forward to the time when the meeting would be held in Newcastle, for he knew well the public spirit and liberality for which it was distinguished. The first paper read was 'On the Use of Mercury,' by T. M. Greenhow, Esq.; and, after detailing some diseases where it might be applied as a powerful remedy, proceeded to state some cases that had come under his notice. Dr. Granville, Dr. Sargent, and Mr. John Fife, made a few observations, generally supporting the use of mercury. The next paper was by Mr. Glover, in which he contended that the dark skin of the negro absorbed more heat than the white skin of the European; from which he, nevertheless, made deductions favourable to the economy of nature, in tropical climates, as it affected the human frame. The last paper was an important, but rather an abstruse one, by Dr. Reed, on the division of certain nerves, and the effects on respiration and digestion, after which the section adjourned.

SECTION F.—Statistics.
Colonel Sykes in the Chair.

President—Colonel Sykes, F.R.S., V.P. Statistical Society, London. *Vice-Presidents*—Sir C. Lemon, Bart., M.P., F.R.S., G. R. Porter, Esq., Board of Trade, Charles William Digge, Esq. *Secretaries*—James Heywood, Esq., W. R. Wood, Esq., J. Aspinall Turner, Esq. *Committee*—Sir M. W. Ridley, Bart., G. W. Wood, Esq., M.P., James Losh, Esq., Dr. Taylor, Rev. W. Turner, Jun., R. W. Rawson, Esq., William Felkin, Esq., J. Shuttleworth, Esq., Henry Romilly, Esq., Dr. Bowring, General Briggs, W. Cargill, Esq., W. H. Charlton, Esq., L. Hindmarsh, Esq., Rev. Joseph McAlister.

The papers read were—1. 'Newcastle Police Returns,' by John Stephens, Superintendent of Police. 2. 'Statistical View of Mining Industry in France,' by G. R. Porter, Esq., of the Board of Trade. 3. 'Statistics of Vitality in Cadiz,' by Colonel Sykes, F.R.S., Vice-President of the Statistical Society of London. Mr. Porter's paper is "drawn from the official reports of the 'Direction Générale des Ponts et Chaussées et des Mines,'" and is of such national interest, that we have pleasure in copying the printed account which was presented in the Section.

"If, after having completed a careful examination into the condition of the various material elements that together make up the sum of the social and political advantages of England, a man were called upon to declare to which one among those elements our advanced position is chiefly to be ascribed, we can hardly doubt what would be his decision. The mineral deposits found in such rich abundance, and in such great variety, beneath the soil in so many quarters of the island, would at once be acknowledged as the chief source of our manufacturing and commercial greatness, and thence of our political and social advancement. No country in the world offers a finer field than England for geological researches, and nowhere has the science of geology been pursued with greater ardour or with better success. It would be superfluous, while addressing any Section of the

British Association, to enlarge upon these facts, or to offer in any way to testify to the interest with which the researches of the accomplished geologists included among its members are watched throughout the scientific world. The amount of their discoveries, and still more the philosophic spirit in which they are conducted, have shed and are shedding lustre upon our age and country. In the opinion of Sir John Herschel, than whom no one is better qualified to judge on such a subject, 'geology, in the magnitude and sublimity of the objects of which it treats, undoubtedly ranks in the scale of the sciences next to astronomy.' It is, perhaps, not reasonable to expect that minds to whom the science owes this proud distinction, should descend from the heights of inductive reasoning to the commonplace paths of social and commercial utility; but it is surely surprising that, among a people so proverbially practical as we are, the advantages which, under this aspect, might be drawn from such researches, should be so little the subjects of inquiry as they hitherto have been: even the amount of one of the most important of our mineral products is so much left to conjecture, that the produce of our coal-mines at the present day is variously estimated by men conversant with the subject at from 15,000,000 to 30,000,000 of tons per annum. To obtain accurate returns of this nature is beyond the power of individuals, and even of the government, unless it should be armed with legislative authority for the purpose. Any such interference with private interests has always been viewed in this country with the greatest jealousy, and it is probable that at no former period of our history would any administration, however powerful for other purposes, have succeeded in obtaining such an authority from parliament. Its motives in seeking for the information would have been misunderstood, and the value of the knowledge when obtained might even have been questioned. In both these respects, the public mind has made considerable advances of late years; and as it may now be seen that the necessary authority has been given in France, where it is at least as liable to abuse as it would be in this country, and that it has been employed for some years by the French government without producing any thing save advantage to the mining interests of that country and to the nation at large, it may be found less difficult than heretofore to obtain the authority of parliament for the collection of statistical data upon various subjects connected with the productive industry of England. The law which gives authority to collect statistical details of the mining industry of France was passed by the legislative chambers in April, 1833. The execution of the duties enjoined by that law, is entrusted to a public department known as the 'Direction Générale des Ponts et Chaussées et des Mines,' and placed under the ultimate control of the minister of commerce and of public works. Attached to this department is a staff of well-instructed able engineers, who make a personal inspection of every establishment connected with mining operations, and a report is carefully drawn up from materials supplied by these officers, and presented every year to the minister of public works. These reports present a most elaborate view of every branch of mineral industry in each department of the kingdom; and it may excite surprise on the part of an English audience, to learn that eighty-five out of the eighty-six departments into which France is divided are, in some branch or other, interested in the inquiry: some of them, it is true, are so interested

in only a trifling degree; but Gers is the only department which does not in any way add to the mineral wealth of France. In the earlier stage of their labours, the inspecting engineers limited themselves to the collection of information concerning the actual condition of the establishments visited during the current year; but they have since obtained materials for comparing the annual progress of the most important branches, and have compiled and presented tabular statements of the quantity and value of mineral fuel and of various metals produced in each year, from 1814 to 1836 inclusive. From these tables, the results of which will be given hereafter, it will be seen at what a rapid rate of increase the mineral resources of France have of late years been developed—a rate which may reasonably suggest the probability of its being in some part owing to the public attention having been drawn to the subject, and still more to suggestions offered to the proprietors of works by accomplished engineers, at times when the works have been inspected. The increase in the value of the coal, iron, lead, antimony, copper, manganese, alum, and sulphate of iron, since the system of inspection was begun, has been from 105,750,995 fr. (4,230,039*l.*), in 1832, to 154,228,455 fr. (6,169,138*l.*), in 1836, or 45 per cent, as under:—

	1832	1836
Coal, Lignite, and Anthracite	Francs. 16,079,670	Francs. 26,007,071
Iron and Steel	87,312,994	124,384,616
Silver and Lead	856,673	821,534
Antimony	71,233	365,082
Copper	247,680	196,924
Manganese	105,150	152,671
Alum and Sulphate of Iron	1,077,595	1,790,697
Total	105,750,995	154,228,455

The increase experienced in the same branches during the four years that preceded these inspections, viz., from 1828 to 1832, amounted to no more than 304,392 fr., or 12,175*l.*, while the increase experienced during an equal period under the system of inspection, viz., from 1832 to 1836, has been, as above stated, 48,477,460 fr., or 1,939,098*l.*

"Coal.—There are 46 coal-fields (*Bassins houilliers*) from which that mineral is obtained in France. These coal-fields are situated in the following departments, 30 in number, which are here arranged in the order of their productiveness, as shewn by the quantity procured in 1835, and stated in English tons:—

	Tons.		Tons.
Loire	812,914	Rhône	7,463
Nord	331,605	Mayenne	6,206
Saône et Loire	142,149	Ardeche	5,229
Aveyron	119,152	Pas-de-Calais	3,736
Gard	45,569	Moselle	3,015
Calvados	41,511	Corrèze	1,783
Nièvre	30,162	Creuse	1,576
Haute Loire	21,883	Vosges	1,356
Loire Inférieure	21,742	Dordogne	1,000
Tarn	18,430	Haut Rhin	537
Hérault	16,301	Vendée	504
Haute Saône	16,128	Bas Rhin	177
Allier	13,626	Cantal	171
Maine et Loire	11,556	Lot	60
Puy-de-Dôme	11,367	Aude	22

The coal-mines in the department of the Loire are the most important, as well on account of the quality of their produce as of the extent and geographical position of the field. This occupies the entire width of that narrow part of the district of Forez which separates the Loire from the Rhône, where these two rivers approach the nearest to each other. Being thus situated near two navigable rivers, the produce of the mines readily finds its way to Marseilles, Mulhausen, Paris, and Nantes: Lyons is sup-

plied by means of the railroad between that city and St. Etienne. There are 45 separate mining establishments, which extend over an area of 42,038 English acres. In the department du Nord coal is raised by eight different establishments from the coal-field of Valenciennes, which is a prolongation of the great coal formation of Belgium. The produce is distributed by the Scheldt, the Scarpe, the canal of St. Quentin, the Oise, and the Seine, and is used in the department du Nord, in the Pas-de-Calais, and in Paris. The department of the Saône et Loire contains two distinct coal-fields. The largest of these (Bassin du Creusot et de Blanz) has 13 mining establishments over a surface of 77,376 acres: only eight of these establishments were in course of prosecution in 1835. At Creusot, where the pits are deepest, the workings are 650 feet below the surface. A large proportion of the produce is used in the iron-works at Creusot, the remainder is distributed by the canal of the Centre to the departments of the Upper Saône and of the Upper and Lower Rhine. The smaller coal-field in this department (Saône et Loire) has three mining establishments in operation, extending over 17,560 acres. The produce, which serves for almost all manufacturing purposes, is conveyed by a railway of 17 miles long to the Burgundy Canal, by means of which it is distributed through Alsace and to the valleys of the Yonne and the Seine. In Aveyron there are three coal-fields, for working which there are 23 mining establishments. The produce is for the most part used in the manufactories of Decazeville and de la Forezie. If the navigation of the Lot were improved, the coal of Aveyron might readily be conveyed to Bordeaux. The Bassin d'Alais, in the department du Gard, although occupying a surface of 66,510 acres, and worked at 20 different points, produced in 1835 less than 50,000 tons. Nearly the whole that is raised is used in the iron-works in the same district: the quantity is thus limited because of the deficiency of roads or other means of distribution. A projected railroad, to connect the mines with the Rhône and the canal of Languedoc, would give a great impulse to mining industry in this quarter, by conveying

the produce to Narbonne, Perpignan, Marseilles, and Toulon, thus rendering it available for steam navigation in the Mediterranean. The Bassin de Littry, in Calvados, supplies fuel to Bayeux, Vire, and Caen. A part of the produce is used on the spot for lime-burning. The first steam-engine that was used in France, was employed in 1749 to clear these coal-pits of water. The produce raised in the remaining 24 departments is so small, that it would be trifling with the time of the Section to offer any particular account of their mines. A Table is subjoined, in which are stated the quantity and value, in English measure and money, of the coal, lignite, and anthracite, respectively, raised in all the departments of France, in each year, from 1814 to 1836. It will be seen from this Table that the produce has been increased from 675,747 tons, in 1814, to 2,583,587 tons, in 1836, or 282 per cent. If this interval of time is divided into three nearly equal periods, the average annual produce in each period has been as follows:—Seven years, 1814 to 1820, 792,496 tons; eight years, 1821 to 1828, 1,197,491 tons—increase, 51 per cent; eight years, 1829 to 1836, 1,835,831 tons—increase, 53 per cent from second period. The increase, comparing the first and third periods, is 131 per cent. The whole number of mines in operation in 1836, was—

Coal	189	—	employing 19,813 workmen.
Lignite....	44	—	1,101 —
Anthracite	25	—	919 —
Total ..	238	—	21,913 —

Great as the increase has been of late years in the produce of the French coal-mines, the inspectors give it as their opinion that it is very far from having reached its utmost limit. On the contrary, they predict that this branch of the national industry will shortly exhibit a more rapid progress than any hitherto seen. Large establishments are in the course of formation in the great field of the Loire, as well as in other localities; and it is expected that the opening of cheaper means of communication will give an impulse to coal-mining in quarters where it has hitherto been scarcely attempted.

Statement of the Quantity and Value of Coal, Lignite, and Anthracite, raised in France, in each year, from 1814 to 1836.

YEARS.	COAL.		LIGNITE.		ANTHRACITE.		TOTAL.	
	Tons.	Value.	Tons.	Value.	Tons.	Value.	Tons.	Value.
1814	636,835	£. 261,112	23,085	£. 9,161	5,689	£. 1,924	665,610	£. 272,097
1815	715,276	324,823	23,300	11,608	5,735	1,965	744,311	338,416
1816	764,785	322,648	25,504	11,239	4,723	1,646	795,012	335,533
1817	815,229	342,976	27,340	16,060	4,572	1,579	847,141	360,615
1818	723,471	313,704	29,660	14,562	5,018	2,129	758,069	330,386
1819	761,800	333,516	44,113	11,816	6,007	4,374	811,960	349,738
1820	871,980	370,114	43,977	21,464	7,405	3,827	923,362	395,405
1821	913,213	395,771	39,122	19,344	5,676	2,490	958,011	417,605
1822	950,889	400,842	49,603	21,316	8,220	3,773	1,007,722	425,931
1823	950,642	404,846	49,194	22,399	9,313	4,507	1,009,149	431,752
1824	1,065,016	435,625	41,632	19,897	15,222	6,481	1,119,270	468,073
1825	1,176,538	482,636	59,242	25,006	29,374	9,915	1,259,154	517,621
1826	1,217,963	520,812	68,116	29,201	14,966	5,992	1,301,045	556,005
1827	1,344,432	557,130	57,838	35,214	25,483	12,185	1,427,753	604,529
1828	1,403,239	665,783	64,939	26,764	29,647	14,969	1,497,825	607,466
1829	1,378,136	539,447	59,719	27,747	32,512	16,884	1,470,367	579,478
1830	1,477,513	592,118	64,348	24,000	30,761	16,221	1,572,622	622,939
1831	1,403,124	549,452	52,513	19,723	36,631	16,726	1,496,268	585,901
1832	1,549,636	600,389	69,177	22,314	38,398	20,483	1,657,211	643,186
1833	1,633,776	672,893	58,274	26,160	45,180	25,288	1,737,230	724,341
1834	1,962,085	748,946	86,064	31,166	53,987	30,715	2,102,136	810,827
1835	1,957,022	793,281	101,508	39,433	57,603	32,532	2,116,133	865,246
1836	2,394,299	1,000,018	96,240	36,514	54,296	27,750	2,544,835	1,064,282

In this table metrical quintals are converted into English tons, at the rate of 10-1465 metrical quintals to a ton, and francs are reduced to sterling money at the exchange of 25fr. per pound sterling: fractions are discarded. During the years embraced in the foregoing table, the use of coal in France has been increased in a greater degree than the productiveness of the

mines, as will be seen from the following statement of the quantity imported for consumption (commerce special), in each year, from 1815 to 1836:—

Tons.		Tons.	
1815	245,633	1819	234,102
1816	315,015	1820	276,705
1817	235,369	1821	315,795
1818	277,624	1822	332,192

Tons.		Tons.	
1823	321,497	1830	621,420
1824	456,644	1831	533,259
1825	490,325	1832	667,251
1826	495,325	1833	686,118
1827	531,890	1834	730,281
1828	570,010	1835	765,365
1829	539,247	1836	949,573

The greater importations of the last three years have been encouraged by a partial diminution in the rate of duty on consumption—a measure rendered necessary by the rapid extension of steam navigation. This great invention, which appears to be only now beginning to develop its full energies, will probably soon compel a further relaxation on the part of the French government, and will, in various ways, cause a great and permanently extending increase to this most important branch of the mining industry of England.

Iron.—At the present time France occupies the second rank among nations as regards the production of iron, England being still immeasurably in advance of France, in which country the extension of this branch of industry is far less than has been effected of late years with us. There are at this time in France, twelve distinct localities, or districts, in which the making of iron is prosecuted. The processes employed for the conversion of the ore in these different sets, or groups, of iron-works, differ materially from each other, in respect of the different kinds of fuel employed for the purpose. May it not be owing, in a great measure, to this circumstance, that improvements in the manufacture have hitherto made a very slow progress in that country? The improvement applicable to the process where one kind of fuel is used, may be inapplicable to works where another kind of fuel is consumed; and it will therefore probably be confined to the spot in which it is originated. If the processes used for the conversion of the ore had been identical at first, it would not have been possible thus to limit improvements, which, in whatever district they had begun, must have been adopted throughout the country as speedily as the requisite knowledge could be diffused, or the needful apparatus obtained. The twelve distinct districts in which the making of iron is prosecuted in France, are thus distinguished in the official reports:—

Departments.

1. Group of the North-east—Ardennes, Moselle, Meuse.
2. — of the North-west—Eure, Orne, Mayenne, Morbihan, Sarthe, Loire Inférieure, Côtes du Nord, Eure et Loir, Ille et Vilaine, Manche, Loir et Cher, Maine et Loire.
3. — of the Vosges—Bas Rhin, Vosges, Moselle.
4. — of the Jura—Côte d'Or, Haute Saône, Doubs, Jura.
5. — of Champagne and Burgundy—Côte d'Or, Haute Marne, Vosges, Meuse, Marne, Aube, Yonne.
6. — of the Centre—Nièvre, Cher, Allier, Saône et Loire.
7. — of the Indre and la Vendée—Vendée, Indre, Cher, Vienne, Indre et Loire, Loir et Cher, Haute Vienne.
8. — of the coal-fields of the South—Creuse, Puy-de-Dôme, Cantal, Aveyron, Gard, Ardèche, Loire, Isère, Ain.
9. — of Périgord—Charente, Dordogne, Lot et Garonne, Tarn et Garonne, Corrèze, Haute Vienne.
10. — of the Alps—Drôme, Isère, Hautes Alpes, Vaucluse.
11. — of the Landes—Landes, Gironde, Lot et Garonne.
12. — of the Pyrenees—Basse Pyrenees, Haute Pyrenees, Ariège, Aude, Pyrenees Orientales, Hérault, Tarn.

The actual and relative importance of these groups may be seen from the following particulars, given in the report presented in the present year, and having reference to the working of 1836.

Value of Products in English Money.	Quantity of Products.				Quantity of Fuel in Tons and Stiers.				Number of Workmen.	Number of Works.	Group.
	Cast-iron.	Bar Iron.	Steel.	£.	Wood.	Coal.	Coke.	Wood Charcoal.			
500,999	162	103	103	500,999	46,233	30,450	3,530	90,344	2,233	94	1
910,298	11,182	11,182	11,182	910,298	29,755	29,755	54,051	54,051	1,771	59	2
627,400	161	161	161	627,400	54,737	28,380	7,315	126,754	2,006	147	3
691,383	769	769	769	691,383	81,459	42,309	10,947	139,602	1,622	162	4
61,065	27,029	27,029	27,029	61,065	36,993	37,029	14,084	71,068	1,242	124	5
377,168	27,276	27,276	27,276	377,168	5,834	29,440	87,444	17,564	1,493	21	6
172,916	46	46	46	172,916	115,038	39,130	39,130	39,130	115	115	7
62,535	1,130	1,130	1,130	62,535	5,251	17,466	6,114	17,466	1,174	21	8
171,140	3,674	3,674	3,674	171,140	2,021	7,118	30,742	30,742	1,174	21	9
3,585,739	2,725	2,725	2,725	3,585,739	34,061	303,739	112,383	303,739	815	815	10
									815	815	11
									815	815	12

The figures given in the foregoing table do not present, in all their importance, the extent of this branch of industry in France. The number of workmen employed for the production of pig-iron (*fonte*), malleable iron (*gross fer*), and steel, which alone are there included, does not much exceed one-third of the number engaged in all the various processes of the iron manufacture; and the total value of the material produced, instead of being, as in the above statement, 3,585,739*l.*, amounted, in 1836, according to the returns of the inspectors, to 4,975,424*l.* The following abstract contains all that it appears desirable to offer on this occasion, and presents, under five principal divisions, the total number of workmen engaged in the manufacture, with the value created by them in each of those divisions:

	Number of Workmen.	Value Created.
1. Extraction and Preparation of the Ore	17,557	£500,632
2. Production of Pig-Iron (<i>fonte</i>) ..	6,776	1,069,132
3. Production of Malleable Iron (<i>gross fer</i>)	8,678	1,506,247
4. Founding, Drawing, Rolling, &c.	8,615	812,406
5. Converting, Moulding, Casting, &c. Steel	2,149	106,927
Total	43,775	4,975,424

Rather more than 40 per cent of the value here stated is made up of the cost of the fuel used in the various processes, viz. —

Wood Charcoal	£1,643,836
Coal	13,040
Coke	96,973
Coal	285,235
Peat	604

£9,039,767

This sum is divided among the different processes in the following proportions: —

	£.	Decimal Proportion.
1. Roasting the Ore	1,789	0.007
2. Smelting	1,132,039	55.900
3. Refining, Puddling, Furnaces, &c.	737,898	39.173
4. Casting, Drawing, Rolling, &c.	121,556	5.959
5. Moulding, Casting, &c. Steel	46,502	2.979
Total	2,039,767	100.000

It will be seen, that four-fifths in value of the

fuel is composed of wood. Coke was not used in the iron-works of France until 1821; and at the present time is employed almost exclusively for processes subsequent to smelting the ore. The proportionate value of different kinds of fuel consumed in the various processes in each year, from 1833 to 1836, has been: —

	1833	1834	1835	1836
Wood Charcoal	0.839	0.818	0.964	0.906
Coal	0.066	0.129	0.066	0.140
Coke	0.062	0.050	0.037	0.048
Wood	0.002	0.003	0.001	0.006
*	1.000	1.000	1.000	1.000

The average prices of the different kinds of fuel in 1836, as stated in the Report, were: —

Wood Charcoal ..	54 <i>s.</i> 10 <i>d.</i> per ton.
Coal	18 5 —
Coke	20 3 —
Wood	2 10 per sterc.

The increased proportion of wood, observable in the working of 1836, is caused by the substitution in part, in some works, of wood dried by heat or partially carbonised. By the introduction of a proportion of dry wood in place of charcoal, a diminution in the cost of fuel has been attained; but against this advantage must be placed the smaller produce obtained from the furnace in a given time, as well as a diminution of metal from a given quantity of ore. Where wood charcoal alone is used for smelting, it requires eighteen metrical quintals for the production of thirteen metrical quintals of iron. Where coke and coal are used in the proportion of ten of the former to nine of the latter, it requires about three quintals of fuel to produce one quintal of iron. In some cases, coke is used with charcoal in the proportion of one quintal of coke to two quintals of charcoal, and the produce has been eight quintals of iron for ten quintals of fuel. In the first case (where wood charcoal is used), the cost of the fuel has been 9.92 fr. per metrical quintal of iron, or 4*l.* 0*s.* 6*d.* per English ton. The cost when coke and coal are used, is stated to be 4.45 fr. per quintal, or 36*s.* 1*d.* per ton; and in the third case, where coke and charcoal are mixed, the cost is said to be 7.60 fr. per quintal, or 3*l.* 1*s.* 8*d.* per ton. The value assigned to the produce is —

	Per Quintal.	Per Ton.
In the first case, 30.93 fr., equal to £8 10 <i>s.</i> 4 <i>d.</i>	4 10 4
In the second case, 11.13 fr.,	8 4 11
In the third case, 30.32 fr.,	8 4 11

The mixture of coke and charcoal would, upon the whole, appear to be the most profitable in its result. Deducting from the value of the metal the sum expended for fuel, there would remain, when charcoal alone is used, 4*l.* 9*s.* 10*d.* per ton; when coal and coke are used, 2*l.* 14*s.* 2*d.* per ton; and when coke and charcoal are used, 5*l.* 3*s.* 3*d.* per ton. These calculations are, of course, wholly inapplicable to the circumstances in which the manufacture is placed in this country from the actual and relative cheapness of our mineral fuel. The use of the hot blast has been adopted in several of the furnaces in France. At first it was found that the iron thus obtained was not so well adapted for making bar-iron as that for the smelting of which cold air had been used; but some modifications, which are not particularised in the reports, have been introduced into the process, and this disadvantage has been remedied. No account is given of the quantity of iron made in France earlier than 1824, but from that year the account is regularly stated in the reports, from which the following abstract has been computed: —

	Fig-Iron.		Malleable Iron.	
	English Tons.	English Tons.	English Tons.	English Tons.
1834	194,636	194,636	141,396	141,396
1835	195,598	195,598	143,336	143,336
1836	202,756	202,756	146,621	146,621
1837	213,175	213,175	149,117	149,117
1838	217,604	217,604	151,319	151,319
1839	218,968	218,968	146,549	146,549
1840	222,965	222,965	138,942	138,942
1841	221,433	221,433	141,336	141,336
1842	221,660	221,660	149,982	149,982
1843	232,559	232,559	174,507	174,507
1844	265,028	265,028	206,396	206,396
1845	290,378	290,378	201,691	201,691
1846	303,739	303,739		

As in the case of coals, the importations of foreign iron into France have kept pace with the increase in the native production. The custom house accounts of that country are detailed with great minuteness; but it is not necessary here to particularise the quantities of each description of foreign iron used in France. The value so consumed in each year since 1815, and the amount of duty collected on the same, were as follow: —

Years.	Value of Foreign Iron imported for use.	Amount of Duty collected.	Years.	Value of Foreign Iron imported for use.	Amount of Duty collected.
	<i>£.</i>	<i>£.</i>		<i>£.</i>	<i>£.</i>
1815	87,556	29,840	1836	218,212	130,336
1816	98,063	45,600	1827	186,846	98,960
1817	202,205	122,024	1828	179,635	95,073
1818	163,173	80,491	1829	160,625	84,396
1819	164,238	84,180	1830	187,117	100,476
1820	162,107	81,517	1831	123,183	65,644
1821	226,571	126,545	1832	159,222	82,192
1822	144,193	74,540	1833	174,601	91,569
1823	141,501	86,258	1834	200,573	104,598
1824	164,812	94,157	1835	231,206	121,346
1825	150,690	86,894	1836	252,792	122,842

The production in France of metals, other than iron, is of little or no commercial importance at the present time. The whole value created in the articles of lead and silver, antimony, copper, and manganese, amounted in 1836 to less than 60,000*l.* and gave employment to only 1760 workmen. In noticing this fact, the inspectors encourage the hope that some considerable addition may shortly be made to the produce of mining industry applied to the articles just enumerated; they do not, however, explain the grounds upon which this hope should be entertained, further than by noticing the existence in the country of several promising fields for that industry hitherto allowed to remain unproductive, and by stating that they are occupied in collecting information which may serve to facilitate the future attempts of persons desirous of embarking their energies and their capital in this direction.

Lead and Silver.—There are 11 lead-mines in operation in France, situated as under: —

	Produce in 1836.	Value at £ 1,175
Hautes Alpes	2 46 tons	1,175
Finistère	1 504 —	11,659
Gard	1 4 —	80
Isère	1 54 —	848
Loire	1 22 —	290
Lozère	1 47 —	1,316
Puy-de-Dôme	1 30 —	740
Rhône	3 6 —	98
Total	11 713	16,209

The silver obtained from the soil of France is separated from the produce of some of the lead-mines above mentioned: the quantity and value thus yielded in 1836, were —

Hautes Alpes	203 lbs., valued at £ 660
Finistère	3,517 — 11,542
Lozère	1,028 — 3,588
Puy-de-Dôme	324 — 1,060
Total	5,072 16,650*

The quantity of lead of native production

* The value put upon this produce in the report is thus 5*s.* 6*d.* per oz.

supplies but a small part of the wants of the country. The importations into France from foreign countries, principally Spain, for consumption during the five years from 1832 to 1836, have averaged 14,800 tons per annum. *Antimony.*—This mineral is produced in France from 11 mines, viz.—

	Produce in 1836.	Valued at
Allier	138 tons	£3,864
Ardèche	63 —	1,944
Gard	23 —	628
Haute Loire ..	22 —	652
Lozère	35 —	900
Puy de Dôme ..	130 —	4,073
11 mines. 411 tons.		12,121

Copper.—The produce of copper-mines in France, five in number, is quite inconsiderable. Three of these mines are in the department of Hautes Alpes, and two are in the department of the Rhône. The quantity of metallic copper which they yielded in 1836 was only 102 tons, and its value 7877*l.* The yearly consumption of foreign copper, principally the produce of Russia and of England, during the five years from 1832 to 1836, has averaged 6235 tons.

Manganese.—The manganese-mines are situated as follows:

	Produce in 1836.	Valued at.
Allier	365 tons	£1688
Aude	148 —	570
Dordogne	215 —	951
Haute Saône ..	39 —	31
Saône et Loire ..	900 —	2926
7 mines. 1667 tons.		£3106

The engineers to whom the task of inspecting the mining establishments of France is intrusted, have not confined their inquiries to the objects which have been noticed in this paper: they have included in their Annual Report the statistics of various branches of industry in which mineral substances are produced or employed,—such as bituminous minerals, alum, sulphate of iron, and salt; the produce of quarries, of glass-houses, of porcelain and pottery manufactories, of copper and zinc works, and of chemical processes. By this means it is shewn, that the number of workmen who, in 1836, depended for subsistence upon mining operations and their consequences, amounted to 273,364, while the total value created by their joint labour amounted to 377,684,791*fr.*, or 15,107,392*l.*, viz.:

	Establishments.	Workmen.	Value created.
Coal, Lignite, Anthracite, and Peat ..	2,210	55,735	30,533,922
Iron and Steel .....	..	43,775	134,385,616
Lead, Silver, Copper, Antimony, ..	..	1,760	1,476,161
Manganese .....	..	..	..
Bitumens	6	245	192,128
Alum and Sulphate of Iron	19	1,141	1,760,607
Salt .....	..	16,615	10,397,164
Quarries .....	..	70,396	40,350,419
Glass Manufactures ..	..	10,497	47,474,301
Porcelain, Pottery, and Earthenware ..	..	20,485	27,418,122
Bricks and Tiles, ..	..	44,604	51,939,239
Lime .....	..	4,298	14,713,796
Chemical Products ..	..	2,216	22,043,732
Copper, Zinc, and Lead Works .....	..	1,597	4,999,524
		273,364	377,684,791

SECTION G.—Mechanical Sciences.

Mr. Babbage in the Chair.

President.—Charles Babbage, Esq., F.R.S., &c., &c. *Vice-Presidents.*—Bryan Donkin, Esq., V.P., Inst. C.E., Sir John Robinson, Sec. R.S.E., G. Stephenson, Esq., Professor Willis, Secretaries—R. Hawthorn, Esq., T. Webster, Esq., Sec. Inst. C.E., C. Vignolles, Esq. *Committee.*—R. W. Brandlin, Esq., W. Carmichael, Esq., Peter Clare, Esq., G. Dollond, Esq., W. Fairbairn, Esq., J. I. Hawkins, Esq., E. Hodgkinson, Esq., Dr. Lardner, J. Marcus, Esq., R. Roberts, Esq., J. Scott Russell, Esq., R. Stephenson, Esq., J. B. Thompson, Esq., W. L. Whit-

ton, Esq., Nicholas Wood, Esq., John Taylor, Esq., J. Nasmyth, Esq., J. Minshall, Esq.

A plan of Mr. R. Grainger's, for concentrating the radii of railroads in this neighbourhood, possessed much local interest. M. Garnet, also, exhibited diagrams of a night telegraph, on which he read a paper. Other papers were read, of which anon; for the present we must content ourselves with the following sketch of Mr. Russell on the resistance of fluids to vessels.

'On the Resistance of Fluids to Vessels,' by J. Scott Russell, Esq. Mr. Russell, with reference to the primary or great wave of translation, stated that the law had been correctly established in their researches of former years; that its velocity did not depend upon the velocity or upon any movement of the vessel, nor upon any thing but the depth of the fluid. The resistance of various forms of vessels in relation to waves had also been the subject of experiment in former years, and many forms had been tried to find the one best calculated to meet with the least resistance. These experiments had been conducted on a large scale, and the law of resistance appeared to be a proportion to the squares of the velocities; but this is by no means true, and remarkable deviations occur, owing to the velocity and depth of the wave. A velocity of 4 miles an hour, for instance, requires a force, or propelling power, of 100 lbs.; of 8 miles an hour, would, according to the law of the squares of the velocities, require a power of 400 lbs.; of 12, a progressive proportion,—but this is not the case; a velocity of 8 miles an hour would require a power of 800 lbs.; whereas, the velocity of 12 miles would require a power of only 300 lbs. Thus a considerable deviation is perceived from the law: to a certain extent, the resistance is increased beyond the square of the velocity, and then diminished greatly in proportion to the velocity. And the law may be thus enunciated. The resistance to the vessel is much greater than the square of the velocity only so long as its velocity be less than the velocity of the fluid, and when more, the resistance is much less than the square of the velocity. What, then, should be the form of the vessel? The French and Swedish academies, and our own country, have been adding to their stock of knowledge on this subject, without taking into consideration the element of the wave. Mr. Russell has examined the internal mechanism of the wave; how the minute particles behave themselves; and how motion was propagated. The wave of translation was always *plus*, or positive, above the fluid, and the velocity equal to body of water falling through half the depth of the channel. The question arose, where would the particles extending to the depth be when the wave had passed, or at every instant during its passage. These particles move in two directions horizontally and vertically, all at the same instant and with the same velocity; and when the wave has passed over, the particles are all in the same state of rest, each translated from the point where they were, to a point in the direction of the wave. When the crest of the wave comes over these particles, the upper one is found there describing a semicircle; the particle at half the depth describes an ellipse, and the ellipse becomes gradually flattened; so that the lower particle moves in a straight line from point to point at the bottom of the channel. Mr. Russell's diagram represented with perfect accuracy the behaviour of each particle. With regard to the construction of vessels, the inquiry was pursued thus. How does the vessel act upon the water, and how are the particles moved? And here a remark-

able theory was manifested. A vessel passing through water, if we knew the requisite condition, would meet with no resistance at all, or rather the resistance of the translation of the fluid would be *nil*. The resistance of adhesion was a different thing; and the object to be accomplished would be to remove the particles so far as to allow the vessel to pass through and the particle to return to rest. An analogy was drawn from the law of refraction, the ray passing through the two media. Such is done in a wave, the ordinates of displacement are equal to the ordinates of the wave, forming the curve of least displacement. In trying different forms of vessels, a singular phenomenon was observed. One moved through the water at the rate of 15 miles an hour without the least disturbance, the water being as smooth as glass behind and before it; and this experimental accidental vessel proved to be the exact form of the wave of translation, a solid of least resistance and displacement. And what is more satisfactory, steam-vessels built recently, of the same form, enter the water without the least ripple, and progress at 11 or 12 miles the hour without the slightest sensible resistance. Mr. Russell, therefore, trusted that some progress had been made to the discovery of an irresistible fluid, or rather that we invested it with this property by a knowledge of the constitution of the wave. There was, however, a different wave for every velocity; the form of the vessel should, therefore, vary accordingly, and have the figure of the wave at the same velocity to render this discovery of use for practical purposes.

The ordinary on Monday, for which the Riding-House was fitted up in a very tasteful manner, like an immense tent, was nearly filled with company: above seven hundred sat down to dinner. Mr. Whewell, a Vice-President of last year, presided in the absence of the Earl of Burlington; and gave, very briefly, a few appropriate toasts, which called up the Bishop of Durham, the Mayor (Dr. Headlam), and others. The only matter of scientific interest elicited was, that 1000*l.*, placed by the Duke of Northumberland at the disposal of Sir John Herschel, for carrying on the astronomical observations at the Cape, not being required by that distinguished astronomer, who employed his own instruments and acted at his own personal expense, is to be appropriated to the publication of his work on the subject.

At eight o'clock, the first general meeting was held in the Central Exchange, which spacious room was filled with audience meet for such an occasion, including a multitude of the fair belles of Newcastle.

Mr. Whewell resigned the chair to the President with a suitable address, and the Duke of Northumberland is thus reported to have spoken (*Tyne Mercury*):—"If ever I felt depressed in delivering my sentiments, it is at this moment, for the very favourable manner in which, if he will allow me, my honourable friend has spoken of me. In accepting this office, I feel considerable, and, I trust, pardonable vanity, at the very imposing demonstration that has been shewn in favour of scientific pursuits, and persons who are ever busy and ever exerting themselves in the cause of truth, and who have contributed so much to the moral and social, and he might say, religious improvement of mankind. My anxiety is to occupy as small a portion of your time as I can, for there is important business to be brought before you. In filling this chair, I shall not shrink from what I have to go through, at the same time I shall uphold its dignity by the zeal

and impartiality of my conduct. I trust I shall not only merit the approbation of the persons around me, but that they will also give me their support. I wish to confine your attention to the details likely to be brought forward, but there is one point I have to impress upon the public at large. It must be quite obvious that at a general meeting of this kind, it is totally impossible to control all the opinions that may be expressed, or could the Association be responsible for any theory so brought forward. Their proceedings were made known through reports for which they were responsible, but beyond that they were not responsible. I trust I have not stated more than the Association will bear me out. I have now nothing more to do but to enter upon the business of my office, by calling upon the general treasurer to produce his account."

The Treasurer, Mr. J. Taylor, stated the prosperous condition of the funds; but as we trust to have a still better account to give at the end of the week, we shall pass them now *unaudited*, and proceed to the Secretary's address, which so ably embodies the past, present, and future of the Association, and lay such good grounds for understanding the proceedings (which will follow in succeeding Nos. of the *Gazette*), that we have abridged it for the information of the public at large.

Mr. Murchison said—

"Gentlemen.—At the conclusion of the first Septenary which has elapsed since the establishment of the British Association, the Council have deemed it expedient to direct us to prepare a general and comprehensive view of its past progress and future prospects. In virtue, therefore, of the commission thus entrusted to us, we shall endeavour to perform a task which we cannot approach without a feeling of apprehension and anxiety, impressed as we are with the difficulty of duly appreciating the prominent labours of our associates, and of estimating their bearing and probable influence upon the advancement of science. The space of time, however, which is allotted to this address, will not allow us to attempt an analysis of all the past proceedings of the Association. We are, therefore, compelled to confine ourselves to a few allusions to the reports of former meetings (dwelling more particularly on the last), and to a statement of the great principles which form the basis of our constitution, and which have directed and regulated its practical operations. And if, in thus stating the aims of the Association, and the principles on which it proceeds, we should be guilty of repeating some things which have been better said before, we trust it will be borne in mind that, from the migratory character of our meetings, and the change which that character implies in the body of members present at each, a probability arises that those principles may not be sufficiently understood, if they are not from time to time restated and re-explained. It would be superfluous for us to speak of those objects of the Association which are the most obvious, and which undoubtedly constitute the highest enjoyment these meetings afford us—the union of congenial minds—the mutual communication, without let or hindrance, of the knowledge we have acquired in our respective pursuits—the scintillations of new ideas struck out in private conversation and public discussion. 'This feast of reason, and this flow of soul,' agreeable and instructive as it is, requires no comment; and, though it contributes most essentially to all the purposes for which we are assembled, and gives life to all our proceedings, it is, however, on no account to be regarded as

the chief aim and business of our meetings. That which has, from the first, gentlemen, been laid down as the highest object for which we meet, is to supply the great defect under which science has formerly laboured, of depending solely on individual and insulated efforts, by combining its cultivators into a body politic, calculated to give force and consistence to those efforts, and exercise a powerful influence both on its own members and on the public mind; thus marshalling a scattered militia into an organised and effective army, and converting desultory incursions into a regular and progressive march. The want of some such public authority in matters of science, as belongs to an union like the present, could not be more strikingly shewn than by the service which, on two occasions, the British Association has rendered to astronomy, in obtaining from government the means of effecting the laborious and expensive reductions of the observations—first, of the planets, and lastly, of the moon, which had been made by Bradley, Maskelyne, and Pond. In whatever degree the practical value of science may be beginning to be understood and appreciated among us, business of more proximate interest and more obvious urgency engrosses the attention of our public functionaries and legislators; numerous projects are presented to them, rarely reduced to a practical form, among which they know not how to distinguish which are, and which are not, deserving of national encouragement, and the consequence has been, with few exceptions, the general discouragement of all,—a consequence neither conducive to the reputation, nor serviceable to the interests, of so great a country. But a representation on subjects of science, proceeding from such an association as this, bears a public character, and carries with it a degree of weight which does not, and ought not, to attach to individual applications; and as long as the same judgment and forbearance which has hitherto characterised its course in this respect shall continue to be exercised—as long as special care is taken to ask nothing of government, but what it belongs to the national interests or honour to effect, and what cannot be effected but by national means—so long, doubtless, that attention will be paid to our recommendations which they have already begun to receive. Wisely cautious and reserved in exerting its influence, the Association has hitherto made but few applications to the government. Besides those to which we have before referred, and which were immediately complied with, another was made regarding the slow progress of the trigonometrical surveys of England and Scotland; the latter probably owes its recent acceleration to the attention thus first drawn to the subject, subsequently reinforced by a deputation from the Royal Society of Scotland; but the survey of England, which having commenced nearly half a century ago, has not yet reached the Trent, is still in abeyance; and these northern districts in which we are assembled, and which comprise so large a part of the staple riches of the country, continue without their due share of the advantages which would attend its execution. There have been, likewise, two other national objects on which the Association has expressed its opinion; the one being the establishment of a magnetical observatory in Great Britain, the other an expedition for the purpose of making magnetical observations in the antarctic seas. For the attainment of the former of these objects no interference was found necessary, an arrangement every way satisfactory being determined upon for con-

necting it with the Royal Observatory at Greenwich, on the recommendation of the Board of Visitors. The publication in the present volume of our Transactions of an elaborate report on the variations of the magnetic intensity of the earth (unquestionably one of the most valuable which has hitherto appeared in them, whether we consider the laborious reductions it has required, or the important conclusions to which they lead), recalls our attention to the latter point. The subject is one of such deep interest, that we hope we shall not be thought to trespass too much on the time of the meeting, if we repeat some of Major Sabine's remarks upon it, in his own words:—'I have already adverted to what the influence of the Association may effect, in causing the spaces yet vacant on the map, in the British possessions in India and Canada, to be filled. But beyond all comparison, the most important service of this kind, which this or any other country could render to this branch of science, would be by filling the void still existing in the southern hemisphere, and particularly in the vicinity of those parts of that hemisphere which are of principal magnetic interest. This can only be accomplished by a naval voyage; for which it is natural that other countries should look to England. That the nations that have made exertions in the same cause do look to England for it, cannot be better shewn than by the following extract of a letter of M. Hansteen's, which I take the liberty of introducing here, both for this purpose, and because it expresses in so pleasing a manner, the praise that is so justly due to his own country, and which I am sure will be cordially responded to by all who cultivate science in this country, and particularly by those who know the kindly feeling with which Englishmen are ever welcomed in Norway.' [The letter quoted, and confirmed this statement.] Mr. M. proceeded: 'The subject has in every way a claim on this country. The existence of four governing centres, and the system of the phenomena in correspondence therewith, was originally a British discovery. The sagacity of our countryman Halley was the first to penetrate through the complexity of the phenomena, and to discern what is now becoming generally recognised. England was also the first country which sent an expedition expressly for magnetic observation, namely, that of Halley in 1698 and 1699. Whilst approving and cordially co-operating in magnetic inquiries of other kinds which have their origin in other countries, it is right that we should feel a peculiar interest in that in which we have ourselves led the way, especially when its object is subordinate to none. As the research would require to be prosecuted in the high latitudes, a familiarity with the navigation of such latitudes would be important in the person who should undertake this service; and a strong individual interest in the subject itself would be of course a most valuable qualification. I need scarcely say that the country possesses a naval officer* in whom these qualifications unite in a remarkable degree with all others that are requisite; and if fitting instruments make fitting times, none surely can be better than the present. Viewed in itself and in its various relations, the magnetism of the earth cannot be counted less than one of the most important branches of the physical history of the planet we inhabit; and we may feel quite assured, that the completion of our knowledge of its distribution on the surface of the earth, would be regarded by our contemporaries and by posterity as a fitting enterprise

* Capt. James Ross, R. N.

of a maritime people; and a worthy achievement of a nation which has ever sought to rank foremost in every arduous and honourable undertaking.' The course pursued by the Association in reference to this object, is well calculated to shew the system of its operations and the active, but yet unintrusive and guarded spirit, in which it prosecutes its aims. It was proposed at one of our meetings by the Committee of the Physical Section, that a representation should be made to government of the advantage which would accrue to science from an expedition to the Southern Ocean, devoted to the purpose chiefly of instituting magnetical observations. This proposal first underwent the revision of the Committee of Recommendations, and then obtained the sanction of the General Committee of Scientific Members; subsequent circumstances, however, being considered by the Council as unfavourable to the success of the application, it was not urged at that time upon the government; yet the object was not lost sight of. The Association next procured Reports to be drawn up (from one of which we have quoted the foregoing paragraph), presenting a luminous exposition, both from published and unpublished sources, of the present state of our knowledge of the magnetism of the earth, and of the reasons which there are for wishing to extend to the southern hemisphere those researches which, in the northern, have led to such important conclusions; and thus has the way been prepared, through information thus communicated to the public, for pursuing the intended course with advantage, and making a more effectual application to the government. There may be, once in an age, or in many ages, an individual animated by so lofty an ardour for the advancement of a favourite branch of knowledge, as to engage, at his own cost, in an enterprise (like a recent survey of the southern skies) which it might have become a nation to take upon itself; and there may be an individual whose disinterested munificence may extend to the point of rendering labours of this magnitude as available to the public as if the state itself had contributed its aid; but such sacrifices to science are not only uncommon, they are in general impracticable; and there are numerous most important data and elements for philosophical reasoning with all its train of practical utilities, which individuals cannot be expected to undertake, unless provided with pecuniary assistance. We have already said, that one of the principles on which the Association proceeds is not to look to government for any thing which can be otherwise attained; but when this Institution was established, the founders of it foresaw that it might itself be made applicable, in a great degree, to the object of supplying funds for such undertakings. The resources of other societies are employed on their publications or collections, and it is one of the rules of the German scientific 're-unions' that they shall possess no property. Our objects were more extensive than theirs, and, therefore, our plan was different. We have accumulated property and expended it to give wings to investigation, partly by providing instruments and materials for carrying on certain determinate inquiries, and partly in defraying the expense of labour, especially labour of that kind which, whilst it is of the highest value in its results, possesses no attractions in its execution, and would meet with no adequate remuneration. The present volume of our transactions contains many proofs of the service which the Association has rendered by such applications of its pecuniary means. In the

account there rendered of the discussion of observations of the tides, Mr. Lubbock (the reporter) thus explains the manner in which the last grant of money placed at his disposal has been employed. He reports that two gentlemen had been engaged by him to discuss the observations which had been accumulated at Liverpool and the London Docks; the one series continued during nineteen years, and consisting of 13,391 observations; the other carried on for thirty-five years, and including 24,592 observations; and also to examine carefully the establishment and average height of high-water, in order to ascertain the fluctuation to which these quantities are subject; and, after bearing testimony to the pains and accuracy with which the work has been executed, and stating the conclusions which result from these laborious calculations, adds, that 'they never could have been undertaken but for the interest which has been felt on the subject by some of the most distinguished members of the Association; and but for the pecuniary grants which have at different times been devoted to this object,' expressing at the same time a well-grounded hope, 'that when these results (which have been since published in the 'Philosophical Transactions') are carefully examined, they will not be found disproportionate in value to the great labour and expense which have been required for their attainment.' A service of a similar description has been rendered to Astronomy in the determination, by Dr. Robinson, of the disputed Constant of Nutation from the Greenwich Observations. Of this work, which involves much labour of reduction, and which, to use the words of the eminent astronomer who executed it, the powerful aid of the Association has enabled him to perform, a brief statement only, comprising the method employed and the general results, is given in our Transactions, the fuller details requiring, as the author mentions, a different mode of publication. And this, gentlemen, leads us to remark how unfounded were the apprehensions of those who feared that this Institution would divert the springs from which other societies are supplied, whereas the instances before us prove that their Transactions have been enriched instead of being impoverished by our operations. There is a further remark which we are prompted to make on the work accomplished under Mr. Lubbock's superintendence, by a reference which his report contains to a subject of great interest to the science of Geology. 'I conceive (he says) that the best, if not the only method of investigating alterations in the height of the land above the water, in any given locality where the water is influenced by the tides, will be to examine carefully whether any alteration has taken place in the value of the (tide) constants D and E for that place, the height of high-water being, of course, always reckoned from some fixed mark in the land.' The meeting will here perceive one of those connexions between departments of inquiry apparently remote, which shew how much each is concerned in the advancement of another, and ought to prevent any jealousy respecting the distribution and allotment of our funds. [Mr. M. here explained the care taken for the due and proper disposal of the grants of money by the Association.] The meeting will observe with satisfaction, that the first step towards the solution of the geological question alluded to by Mr. Lubbock, has been taken under the superintendence of the committee appointed for the purpose. Mr. Whewell, to whose more especial super-

intendence the conduct of this work was intrusted, reports that a line has been levelled by Mr. Bunt from Bridgewater to Axmouth, to be thence continued to the Bristol Channel, and that such marks have been left as will allow of repeating or extending the levels, and comparing at a future period the heights of the several fixed points. We are thus led to say a few words about geology, a science which is rapidly advancing to take its permanent station among the more accurate natural sciences. It is now six years since Mr. Conybeare laid before us his eloquent general view of its then existing state; but the lapse of a much shorter period, in a science which is making such vigorous shoots, would present sufficient materials for a report which should enumerate and define the latest conquests it has achieved. The fact is, that the very literature of this subject is so vast, that none but the most practised and laborious geologists can keep pace with its progress; and though the anniversary discourses of the successive presidents of the Geological Society generally contain a sketch of the works and memoirs which have appeared in the course of the preceding year, still we are convinced that a condensed retrospect of the progress of geology, which should embrace a somewhat larger period and a wider range, executed from time to time at the request of the Association, would not only be grateful to geologists, but would also tend to combine the discoveries and promote the advancement of this science. But, besides general reports on geology, this Association will, it is hoped, encourage a continued attention to the consideration of mineral veins, since there is no branch of geology of such direct public interest as the results of the miner's discoveries. In a clear and instructive report formerly read by our treasurer, Mr. John Taylor (himself a most experienced and able miner), he expressed a wish, which we trust to see accomplished, that miners would hereafter not rest satisfied with such observations and knowledge as the mere practice of their art required, but would extend and combine their inquiries in such manner, as to make them the foundation of more general and comprehensive views, and would tend to connect, more intimately than heretofore, the science of geology with practical mining. This subject, so important in its bearing upon the production of our mineral wealth, cannot be too strongly recommended to the attention of the geological and mechanical sections of the Association. We venture, indeed, to hope that the Newcastle meeting will be pre-eminently marked by the diffusion of much sound mining knowledge, flowing, as it must, from the meeting together of the most experienced Cornish miners with those of Durham and Northumberland. We are further encouraged to indulge in this expectation, from knowing that this meeting is honoured by the presence of an Austrian nobleman, long valued by English geologists, and whose thorough acquaintance with mineral veins, and all their complicated faults and changes, well entitle him to occupy the high station confided to him by his sovereign. And here we cannot but observe, that as, with all its mineral wealth, Great Britain is the only country in Europe without a national school of mines, so much the stronger is the call upon the British Association to promote the analysis of every natural phenomenon and useful invention connected with the art of mining. But, while we make this appeal, we cannot assemble in this neighbourhood without congratulating the University of Durham in having led the

• Count Breunner, Director of the Imperial Mines, Foreign Member of the Geological Society.

way in the establishment of a school of mines and engineering, in which the principles and knowledge of this branch of science are regularly taught; and we further feel gratified that so important a charge has been intrusted to men distinguished for their scientific attainments, including in their numbers one of the earliest promoters of the British Association, and one of its local secretaries at this meeting." Mr. M. next dwelt upon the union of mineralogy and chemistry in the arrangements of the Association, and expressed regret that geography had not "hitherto received that amount of attention to which it was justly entitled. The annual reports, however, of the secretary of the Geographical Society, particularly the last report of Captain Washington, and the admirable discourse recently delivered by its president, Mr. W. Hamilton, have, in great measure, supplied this deficiency, making the public acquainted both with much that has been done, and much that remains to be worked out in this very important branch of knowledge. The merits of the statistical section have been already made manifest, by the collection of a great variety of very important data. On this occasion, we have to notice a very perspicuous and well-arranged report, which appears in our Transactions, upon the statistics of a large province of Hindostan, which sufficiently proves that a statistic who would really contribute to the advancement of statistical science, by collecting facts in distant regions, must possess no slight qualifications. In vain, in the absence of other essential branches of knowledge, he may accumulate half-digested and ill-assorted observations: he must also combine, as in the person of Colonel Sykes, the acquirements of the naturalist and geologist, with those of an accomplished soldier and a man of general information. The accumulation of such facts is obviously a very fit part of the labours of this Association, for they prove statistics to be truly a science of method. It has fallen to our precursors to comment on the advances in natural history, which have been made by the section of Zoology and Botany; and although, on this occasion, we are not presented with any report upon these sciences, you all know how ably they have been elucidated at former meetings, by a Lindley, a Jenyns, and a Richardson, and also with what vigour and success that section has prosecuted its inquiries under the auspices of a Henslow and a Macleay. We must, however, here allude to the distinguished Northumbrian naturalist, who occupies one of our vice-chairs, and express our hopes that Mr. Prideaux Selby may soon be called upon to contribute what is yet a desideratum, a report upon the present state of the science of ornithology." The address next alluded to the medical section, and its co-operative labours; the mechanical section, and Messrs. Hodgkinson and Fairbairn's experiments on hot and cold blasts for furnaces; and also on Mr. Russell's admirable experiments on waves; and concluded "by noticing a report by Professor Johnston, on a new and curious subject of chemical inquiry, as affording a good example of the execution of an object which the Association has had much in view. The discovery that there exist definite chemical substances, which are capable, under certain conditions, of assuming more than one crystalline form, not deducible from, or referable to, each other, and accompanied with different physical properties; and, furthermore, that there are instances of substances which are capable (independently of any change

* Professor Johnston.

of composition) of undergoing some internal transmutation sufficient to vary even their chemical affinities: these are discoveries which, pointing out a new road to the investigation of the hidden mysteries of molecular attractions, peculiarly deserve to be verified and extended. But it so happens that they have been little studied or prosecuted in our country; and, therefore, the chemical committee, in accordance with one of the prominent designs of the Association, selected this particular point as the subject of the 'Report on Dimorphism,' which gives a fuller statement than we before possessed, of the facts arrived at by foreign experimenters, the reasonings founded upon them, and the questions which are left for future inquirers to solve." Referring to Newcastle, and the present meeting, Mr. M. said, "Does not this city and vicinity present its own peculiar objects of speculation, and opportunities of research? Is not the optical philosopher interested in its celebrated glass works? Can the chemist contemplate with indifference those conspicuous and truly magnificent establishments, which exhibit on so grand a scale the application of those processes, which have been deduced and perfected in his laboratory, to productions so important in our manufactures and arts? Or can the geological and physical inquirer stand near its mines—those vast store-houses of nature, for the uses of art, the theatre of the most beautiful of all the applications of science to the purposes of humanity,—without having his curiosity awakened? or contemplate those deep excavations, the most accessible of any that have been carried into the bowels of the earth, without being tempted to investigations which may lead, perhaps, to a better understanding of the internal condition and structure of our globe? Or can we survey the architectural creations which surround us in the place in which we are assembled, where order and magnificence have replaced confusion and meanness with a rapidity more resembling the illusions of an Arabian tale, than the sober anticipations of experience, without being encouraged in our own efforts by witnessing such noble results of individual enterprise, genius, and arrangement which have associated the triumphs of art with those of manufactures and commerce, and combined the refinements of wealth with the most varied productions of industry."

* Hic portus alii effodiunt : hic alta theatri
Fundamenta locant alii, immanesque columnas
Rupibus excidunt, scenis decora alta futuris.

Finally, gentlemen, there is another reason for these migrations which it would be highly ungrateful in us to overlook, which is equally felt by the Association and by the place which it visits—the warmth of hospitality which we see these visits call forth, the union of hearts and the excitement of kind and friendly feeling acting on all our objects, like oil on the wheels of a vast and powerful machine, without which its every movement would be retarded, and its whole power brought to a stand. Never, indeed, can the vitality of this Association be impaired, so long as the leaders who have borne the bark of science along the waves shall lay stoutly to their oars. Assembling for a common cause, and confiding in each other, may they ever glory in having knit together all classes in the love of science; and whether pressed over, as on this occasion, by a noble duke, alike illustrious for his just appreciation and generous encouragement of our pursuits, or in the ensuing year by some one eminent in their cultivation, we shall, we trust, go on waxing in strength, and holding out the cheering ex-

ample of a great and triumphant commonwealth of science."

After a few words from the Duke of Northumberland, the meeting broke up.

At night, there was a splendid ball, given by Mrs. Mayoreess, at the Assembly Rooms, where, we are told, about fifteen hundred persons joined the dance and promenade. The rooms were so crowded, we could hardly see them; but the effect was very brilliant, and it was the small hours of morning before even the gravest philosophers thought of retiring.

Not having, by any means, brought up the report of Monday,—for we have left untouched several papers of much importance (such as Sir J. Herschel, 'On Southern Hemisphere Nebula,' in Section A; Mr. Biddle, 'On the Coal Formations,' in Section C, and continued on Tuesday; Mr. Stephens, 'On Crime,' &c., in Section F; to which a supplement was made on Tuesday by a 'Report on Education,' &c.; and all the improvements on various instruments and machines, in Section G,) we may shortly say, that the Sections on Tuesday were not occupied with the consideration of matters generally important to science, or possessed of much originality, though there were many particulars well worthy of record as we continue our course.

On Wednesday, the last night of our sending up any intelligence, the *ensemble* was of greater value. In several of the Sections, reports connected with the principal recommendations of preceding and last year's meetings were produced, and brought down the history of the experiments to the present time. These are, perhaps, the most useful and practical illustrations of the progress of the Association; and, after Mr. Murchison's address, shew what has been done. The inquiries are interesting enough to fill a volume (as they will fill the next volume of the Transactions), and we can merely indicate them now; intending, as we go on, to take up as much of their popular features as can furnish information to those who could not attend their enunciation (we fall into learned words, from the company we are in!).

Of the Model-Room, a new and excellent addition to these meetings, we shall also have something to say.

For the present, *Vale!*

REVIEW OF NEW BOOKS.

A Romance of Vienna. By Mrs. Trollope. Author of the "Vicar of Wrexhill." 3 vols. 12mo. London, 1838. Bentley.

THESE volumes are an interesting miscellany of the lighter topics of the society of Vienna, worked into a romance. The characters are painted with the usual liveliness and discrimination proper to Mrs. Trollope, and much that is conveyed in the form of fiction has so great a semblance to reality, that we look upon this story as a kind of chapel of ease to her graver work on Vienna, its court, and people. Adhering to our often-expressed principle, we leave the plot untouched, and find no difficulty, though the story is very continuous, in extracting some amusing sketches: the following picture of an exclusive set in Vienna is good.

"There is a sort of superstitious fanaticism of clique in Vienna, peculiar to the set of which the Princess Anna made one, and which had assumed to themselves the appellation of *La Crème*, in which pride seems to have no place whatever; for neither high rank, illustrious

ancestry, distinguished station, wealth, worth, talent, or beauty, appear essentially necessary to obtain a place in it; and its requisites, influence, and most mysterious laws, can be explained by no definition, or their effect conceived, even darkly, by any who have not with some patience and attention watched their operation. The third lady present at this secret council was the Princess Waldberg, a beautiful little creature of very illustrious birth, and even royally allied, whose right to take her place among the very first in any circle in Europe could not be questioned, any more than her consciousness of such right. But neither her dignity, nor her value for it, could rob her regular and most delicate features of their feminine softness or their youthful charm; and though her round lip would have been curled in very pretty scorn, had any want of etiquette led her to suspect that her rank was forgotten, the natural sweetness of her nature made her sparkle without dazzling, and would have given to the ermine, had she worn it, all the softened grace of dignity without its stiffness or its weight. That this lady should have been elected of the conclave of '*La Crème*,' was a proof of very judicious ambition in the electors; and her having (together with one or two others whose claims to distinction were likewise unquestionable) consented to enrol herself among them, gave a something of reality to their pretensions, which softened if it could not altogether remove the ridicule attached to the clique. The one gentleman present on this occasion was the Baron Hänseln, less, perhaps, a member than a functionary of the party; for, though of a dozen and half very unblemished descents, the revenue which remained to him was but small, and several generations had passed since the race of Hänseln had sent forth any individual of ability sufficient to set off by personal brilliance the venerable but fading honours of their house to advantage. What he wanted, however, in personal dignity himself, he made up in devotion to the dignity of others: station, fashion, and exclusive privilege, were the idols his soul worshipped; and there was, perhaps, no privation to which he would not have submitted with the uncomplaining courage of a stoic, provided he might thereby ensure his approach to, and communion with, '*La Crème de la Crème*.' Soundly and contentedly would he have slept on a hard pallet every night, so he might flutter through other men's palaces by day; and, with no ultimate object of earthly ambition whatever before his eyes, his existence passed in a succession of entrances and exits to and from the presence of the great, which outlived in constancy and perseverance the efforts of the most sturdy seeker of place and pension upon record. Nor was this labour of love wholly in vain: though neither young, handsome, graceful, intelligent, nor rich, many who possessed all these advantages were ready to declare that he was a most excellent and estimable personage; and, as he certainly often proved a useful one in the execution of many little offices that no one but himself could perform, he had become at the time of which we are speaking, as completely part and parcel of *La Crème* as Madame Zelinsky or the Princess Waldberg themselves. So much of introduction was necessary, in order to give due value to the words spoken in the following conversation; which, trifling as by its nature it may appear to some, was by its results of very great importance to my Ferdinand. By the operation of a habit very prevalent

in Vienna, all the persons expected arrived nearly at the same time, and the business for which they met was immediately brought under discussion. '*Ah ça!*' exclaimed Madame Zelinsky, as the Countess Werteborne entered the room; 'here we all are then, and no time must be lost, dear friends; for the business on which I want you to decide must be set about at the opera to-night.' 'You expect no one else?' said the Princess Waldberg, inquiringly. 'No, dear princess, I had no time; and we are quite enough to do the thing, if we decide upon doing it at all. I would not even let in Fritz, because nobody else should be jealous. *Eh bien!* You know, of course, that Count Barthel has permission to visit Paris; Prince Felix set off last Saturday for Rome; Ludchen Nurnberg, handsome creature! is attached to the embassy at the Porte; and our pet, Moritz de Regensburg, is immediately to join his regiment at Pesth. Now, you perceive that this is an extremely bad preparation for the carnival—for our part of it, at least. The young countesses will be particularly strong this year—I mean those *qui ne sont pas de nous*—for there are a multitude of young *diplomates* and *militaires* whom we disclaim, and that are mighty pretty fellows for all that, who will fill their ranks with great effect, while we shall positively have to look about us for our men. This won't do, dears; and we must recruit. Now, I hate electing a man as one of us, who has been buzzing about for months in the salons, without daring to dream of becoming *Crème*; whenever we do this, we are sure to repent it, for they never fail to greet affectionately somebody or other that they have no business to see, which positively pulls down our landmarks, and makes a confusion altogether detestable. To avoid this, it is absolutely necessary to fix upon something perfectly new; and I beg to propose young Ferdinand de Ringold as likely to do us more credit than any new presentation this year.' This long harangue was heard to the end without the slightest interruption, and with every appearance of lively interest; but, at the conclusion of it, the Princess Waldberg, to whom the last words were rather more addressed than to any one else, said, '*Mais, chère Léonore*, is there not something disgraceful attached to this young man's birth?' '*Eh bien, ma belle, qu'est-ce que cela fait?*' I don't recommend him as a *parti* for your sister the Princess Emilie, nor for your Christina Annabella, my dear countess; but merely to employ him, as I state, to fill our ranks, and take a *tour de waltz* with some credit. We cannot all of us get at the archdukes every night, you know: and it is a great deal better to have such an Adonis as this to make a fuss about, than to see every woman among us watching him making himself amiable among the little countesses; and watch him we shall, you may depend upon it, for I am quite sure we cannot help it.' 'There is a great deal in what you say, dear Leonore, said the lovely Laurensstein, assuming a look of deliberative wisdom which very nearly overset the gravity of the Princess Waldberg; 'I am sure I don't care a straw, for my part, about his birth, provided he can waltz, and take care of one's bouquet sometimes; and heaven knows we are in want of something new to amuse us.' 'Well, then, I withdraw my objection altogether,' replied the charming Waldberg, 'and will send my lauffer to the young De Ringold to-morrow morning to command him to take his *eau sucrée* with me before the opera.' Madame Zelinsky blew a kiss off the two first fingers of her right hand

to thank the princess for this amiable acquiescence; and then, turning to Madame De Werteborne, said, '*Et la chère comtesse?*' 'Oh, you have my vote, decidedly,' she replied; 'and I only wish you had half-a-dozen such *débuts* to propose to us, instead of one.' 'Then the young aide-de-camp is from this moment *Crème de la Crème*.'"

We add an extract which contrasts broadly with the former; it is a description of the private dwelling-room of a Jewish widow, the frau Balthazar.

"In size it was about fourteen feet square, and by no means unhandsome in its form and proportions. Of visible fire—that cheering speak in an old woman's dingy apartment, which speaks of comfort to her that dwells within, and of welcome to those who come from without,—there was none. A cold-looking white earthenware stove occupied one corner; and, after a little reflection, the truth might come upon the mind that possibly a fire was burning within it. The two windows of the room, moreover, were doubly glazed; and therefore, though the light of a winter day was considerably impeded thereby, it was evident that whoever arranged that apartment had no deliberate intention that its inmate should be starved to death. Near the stove, placed straight against the coloured but not papered wall, stood a huge and heavy old sofa, covered with black horse-hair, and having before it the length of about two Flemish ells of narrow, dingy, threadbare carpet: on this was placed a small round table, generally piled nearly to a pyramid with fragments of old scraps, indicative of every species of botching. Three chairs of great antiquity constituted all the other furniture of the apartment. Two of these were richly carved and stuffed, and covered with velvet once crimson, whose fabric had defied the usage of ages; but the third, of comparatively modern date, was formed throughout, without any attempt at ornament, from the sturdy oak. There was, moreover, a large old folding-screen, covered with faded tapestry, which was bent round in such a manner as to enclose a small corner of the room; but apparently it was quite useless as an article of furniture, for it never moved from its place (let the wind blow as violently as it might) to protect the shrivelled tenant of the place, nor had ever been seen to change its quarters, excepting when the frau Balthazar left Vienna for Oberfels (the only journey she ever took), and then it was generally suffered to rest against the wall, or to lie at full length upon the floor. Had any of the very few persons who entered that gloomy room felt sufficient curiosity to make them look behind this lumbering old screen, they would only have seen an extremely clumsy iron coffer, rather rusty, and totally without ornament of any sort. In fact, it was so exceedingly shabby-looking, that no tidy old lady would have suffered it to remain in her room without being in some manner concealed. Such as it was, however, the frau Balthazar appeared to feel great interest in it. Her curtainless bed in the adjoining closet was so placed as to permit her, by means of having her door open, to keep the screen which stood before it for ever within reach of her eyes; and the only personal extravagance she was ever known to be guilty of, was the burning a lamp all night before this mysterious shrine, in such a manner as might enable her to see at a glance if any one approached it. Such was the furniture, and such was the room in which one of the richest women in Vienna passed nine-tenths of her existence during that portion of the year in which she dwelt within its walls."

We have already said that the characters are finely drawn: there is great force displayed in those of the frau Wagner and Imla Balthazar: there is also much nature in that of Count Alderberg, although a more disgusting personage could scarcely be portrayed.

Richardson's Descriptive Companion through Newcastle-upon-Tyne and Gateshead; with their Environs within a Circuit of Ten Miles, &c. &c. &c. 12mo. pp. 360. Newcastle, 1838. Richardson. London: Longman and Co.; Tilt.

WITH a plan of the town on a considerable scale at the beginning, and a map of the country for ten miles round at the end, this volume, "designed as a useful and entertaining guide to all subjects of interest and curiosity for which the locality is celebrated," seems to us, as far as we can judge from a limited experience upon the spot, well calculated to fulfil the purposes for which it has been written. Surtees has enabled Mr. Richardson to take a more enlarged view of antiquities connected with this important district than is usual with works of the class of guide-books; and his predecessor Sykes has also, by acting the part of a diligent pioneer, rendered him good service in Newcastle and its more immediate vicinity. But he appears to us to have used, not slavishly to have followed, his excellent authorities; and thus to have produced a work in which, from his own additional research, he has judiciously blended the necessary information to the present date.

The vast improvements which have been made, and which are still making rapid progress here, furnish materials not less deserving of attention than those which belong to antiquity. From contemplating all that remains to be told of Britons, Romans, Saxons, Danes, we turn, with wonder, to the sights which are glancing before us every hour at this day. Where the Roman Wall restrained the hostile incursions of half-subjugated natives, the railroad now transports the rich mineral products of a peaceful, civilised, and highly industrious community. The wild barbarians have melted into an immense and busy hive, among whom the incessant labours of various manufactures never cease. The *Sagedunum* of Severus, the termination of his stupendous wall is now only famous for its *Walls' End* coal! Later, where St. Cuthbert and Aidan preached the Gospel, and the venerable Bede first laid his bones, the hourly steam-boats track the river and the sea. We could almost imagine the *Religious* of Tynemouth Priory, the foundation of Edwin and Oswald, kings of Northumberland (A. D. 617-34), rising from their long sleep and starting at the demonlike vessels rushing impetuously past their lovely steep upon stream and the ocean. What were all their legends of the foul fiend and diabolical agencies compared with these magical emblems of human ingenuity? Would they not believe that Satan himself commanded the smoking fleet, and that he was on a voyage of discovery and conquest from his lower dominions against the nations of the earth? Assuredly, they would; and hurry in terror to their shrines from the appalling invasion of Belzebub and his infernal force, clouded in sulphur and steam, dashing the sea to pieces with his resistless machinery and moving whithersoever he pleased in defiance of all the obstacles of nature, insurmountable to aught but superhuman force. A modern Milton (if Newcastle can supply one) might pen an epic on the subject.

But, we must return to Mr. Richardson;—from the sublime to the useful. We have found his companion most companionable; and we are sure that all the stranger members of the British Association are much indebted to him for the trouble he has saved, and the intelligence he has afforded them. So, also, are his fellow-townsmen, for rescuing them from at least some of the interminable questions of their numerous, and, though philosophers, very curious and inquisitive visitors. And when this occasion has become matter of history to the living and future inhabitants of the *Pons Ælii*, still this volume will serve as a guide to travellers and a pleasant remembrance of what they have seen in a place and country of singular attraction.

We have only to notice, that a short but able essay into the origin of the primitive Britons is prefixed to this work; which is thus entitled to take historical as well as local rank on the shelves of the library.*

The Sonnets of William Wordsworth, collected in One Volume; with a few additional ones, now first published. 8vo. pp. 477. London, 1838. Moxon.

WE have so often given our opinion upon productions of Mr. Wordsworth, (rising, as we have, from feelings of admiration, mingled with strong doubts and objections to parts and to certain ideas entertained by the poet, to almost unmixed admiration, as he laid aside his *simplicities* and allowed his healthy mind to expatiate over the beauties of nature and natural emotions), we have, we repeat, so often ventured to express our humble judgment on his genius, that general remark would now be utterly superfluous. Of his Sonnets, thus agreeably collected together, it is enough to echo the sentiment of every reader of taste and heart, that no one since Milton has so adorned our language in this species of composition; and that he often equals the mighty bard in sublimity of conception, thought, and style, and excels him in tenderness and pathos. This is, therefore, a delightful volume—a nosegay to the sense. We subjoin three of the new additions to the former ample store. How justly may we accord our assent to the following

"Valditory Sonnet.

Serving no haughty muse, my hands have here
Disposed some cultured flowerets (drawn from spots
Where they bloomed singly, or in scattered knots)
Each kind in several beds of one parterre;
Both to allure the casual loiterer;
And that, so placed, my nurslings may requite
Studious regard with opportune delight,
Nor be unthanked, unless I fondly err.
But, metaphor dismissed, and thanks apart,
Reader, farewell! My last words let them be,—
If in this book fancy and truth agree;
If simple nature, trained by careful art,
Through it have won a passage to the heart;
Grant me thy love, I crave no other fee!"

The next speaks home for a much-oppressed race.

"A Plea for Authors. May 1838.

Failing impartial measure to dispense
To every sutor, equity is lame;
And social justice, stript of reverence
For natural rights, a mockery and a shame;
Law but a servile drape of false pretence,
If, guarding grosser things from common claim
Now and for ever, she, to works that came
From mind and spirit, grudge a short-lived fence.
'What! lengthened privilege, a lineal tie
For books!' Yes, heartless ones, or be it proved
That 'tis a fault in us to have lived and loved
Like others, with like temporal hopes to die;
No public harm that genius from her course
Be turned; and streams of truth dried up, even at their
source!"

* The author informs us that, by an error in the returns made to him, he has under-rated the population of Newcastle about 4000. It is near 54,000, and, with Gateshead, about 75,000.

"A Poet to his Grandchild; sequel to the foregoing.
'Son of my buried son, while thus thy hand
Is clasping mine, it saddens me to think
How want may press thee down, and with thee sink
Thy children left unfit, through vain demand
Of culture, even to feel or understand
My simplest lay that to their memory
May cling;—hard fate! which haply need not be
Did Justice mould the statutes of the land,
A book time-cherished and an honoured name
Are high rewards; but bound they nature's claim
Or reasons?—No! hopes spun in future's line
From out the bosom of a modest home
Extend through unambitious years to come,
My careless little-one, for thee and thine!
"May 23."

The Rise and Progress of the English Constitution: the Treatise of J. L. De Lolme, LL.D., with an Historical and Legal Introduction, and Notes. By A. J. Stephens, M.A., F.R.S., Barrister at Law. 2 vols. 8vo. London, 1838. Parker.

DE LOLME'S "Essay on the English Constitution" is so universally known, and its value so justly esteemed, that any remarks on it at the present time would be worse than superfluous. Our task, then, is limited to a notice of Mr. Stephens's labours, which are of the very first order, and form a most important addition to our really national literature. Although many editions of this work have been published during the last fifty years, they have all been, more or less, inaccurate and imperfect; probably that of Mr. Hughes Hughes, which appeared in 1834, is the best: but even that is very far from perfect. In the present edition, Mr. Stephens has prefixed a volume of original matter to De Lolme's Essay, to which he has added many very valuable notes. The original portion of the work is judiciously terminated with the reign of William the Third; in order, says the author, "to avoid controversy with any political party in *esse*,"—consequently, allusions to men and measures of the present day are utterly disclaimed." It, besides, contains a complete sketch of the Rise and Progress of the English Constitution, which may be beneficially studied by every one who is at all connected with the politics of the day, and there are very few, indeed, who are not. This work must, therefore, take that station to which it is so justly entitled; and become a book of reference and authority in all disputed points in the history of our constitution. Mr. Stephens deserves the thanks of the political world for the important services he has rendered to it in making De Lolme's Essay accord with the various alterations and changes which have taken place since that work was originally written.

AMERICAN LITERATURE.

[In continuation from No. 1126.]

OF Mr. Mahan's elementary course of *Civil Engineering* (No. 3), it is unnecessary for us to say more than that it is a very complete treatise for the military cadets of America; and we pass to the account of a people to whom the art was unknown.

We now come to the *Life of Brant* (No. 4). This Chief occupied so important a position during the revolutionary war, and his influence with his tribe was so great, that his life is a most important and interesting addition to our stores of American history. Mr. Stone has performed his task with great judgment and impartiality, and has rendered his work as valuable as it is entertaining, and we are confident it will be as popular on this side of the Atlantic as it has so justly been on the other. The volumes are so full of *selectable* matter,

that we give an extract at random: it is a reference from the body of the book.

"The fury and cruelty of the Indians and Tories at and immediately after the battle of Oriskany, is strongly set forth in the following affidavit, the original of which is now in the office of the secretary of state, Albany. Dr. Younglove died about fifteen years since, in the city of Hudson. He was known to the author as a respectable man, though of strong feelings and prejudices. Any statement of this kind, from a man of his temperance, would be likely to receive a strong colouring, without, however, any designed misstatement of facts.

"Moses Younglove, surgeon of General Herkimer's brigade of militia, deposeseth and saith, that being in the battle of said militia, above Oriskany, on the 6th of August last, towards the close of said battle, he surrendered himself a prisoner to a savage, who immediately gave him up to a sergeant of Sir John Johnson's regiment; soon after which, a lieutenant in the Indian department came up, in company with several other Tories, when said Mr. Grinnis, by name, drew his tomahawk at this deponent, and with a deal of persuasion was hardly prevailed on to spare his life. He then plundered him of his watch, buckles, spurs, &c.; and other Tories following his example, stripped him almost naked with a great many threats, while they were stripping and massacring prisoners on every side. That this deponent, on being brought before Mr. Butler, sen., who demanded of him what he was fighting for; to which this deponent answered, 'He fought for the liberty that God and Nature gave him, and to defend himself and dearest connexions from the massacre of savages.' To which Butler replied, 'You are a damned impudent rebel!' and so saying, immediately turned to the savages, encouraging them to kill him, and if they did not, the deponent and the other prisoners should be hanged on a gallows then preparing. That several prisoners were then taken forward toward the enemy's headquarters with frequent scenes of horror and massacre, in which Tories were active as well as savages; and in particular one Davis, formerly known in Tryon County on the Mohawk river.

That Lieut. Singleton, of Sir John Johnson's regiment, being wounded, entreated the savages to kill the prisoners, which they accordingly did, as high as this deponent can judge, about six or seven. That Isaac Paris, Esq. was also taken the same road, without receiving from them any remarkable insult except stripping, until some Tories came up, who kicked and abused him; after which the savages, thinking him a notable offender, murdered him barbarously. That those of the prisoners who were delivered up to the provost guards, were kept without victuals for many days, and had neither clothes, blankets, shelter, nor fire; while the guards were ordered not to use any violence in protecting the prisoners from the savages, who came every day in large companies with knives, feeling of the prisoners, to know who were fatterest. That they dragged one of the prisoners out of the guard with the most lamentable cries; tortured him for a long time; and this deponent was informed, by both Tories and Indians, that they ate him, as appears they did another on an island in Lake Ontario, by bones found there nearly picked, just after they had crossed the lake with the prisoners. That the prisoners who were not delivered up were murdered in considerable numbers from day to day round the camp, some of them so high that their shrieks were heard. That Capt. Martin, of the batteaux-

men, was delivered to the Indians at Oswego, on pretence of his having kept back some useful intelligence. That this deponent, during his imprisonment, and his fellows, were kept almost starved for provisions; and what they drew were of the worst kind, such as spoiled flour, biscuit full of maggots, and mouldy, and no soap allowed, or other method of keeping clean; and were insulted, struck, &c. without mercy by the guards, without any provocation given. That this deponent was informed by several sergeants orderly on Gen. St. Leger, that twenty dollars were offered in general orders for every American scalp.

"MOSES YOUNGLOVE."

We shall conclude with this; but again cordially recommend the work to all our readers, and more especially to those who wish to inform themselves on the subject of the American revolution.

[To be continued.]

MISCELLANEOUS.

Memoirs of George Monk, Duke of Albemarle. From the French of M. Guizot. By the Hon. J. Stuart Wortley. 8vo. London, 1838. Bentley.

This is a very calm and impartial view of a very eventful and remarkable period in English history, and an equally unprejudiced biography of a man who acted hardly the second important part of the great tragic drama then performed. The subject is so familiar to readers, that we will not trespass upon them with any quotations, which must be longer than we could admit to exemplify the manner in which M. Guizot has treated it. Suffice it to say it is able and statesmanlike; looking to the right and left for authorities, and combining the whole into a narrative at once simple, and bearing the strong impress of truth. The translation and editing do credit to the original; and wherever works are found descriptive of this memorable era, the present volume will richly merit a place, were it only to cool down and correct the partisan and party misrepresentations which abound on all sides.

The Oakleigh Shooting Code, by Tom Oakleigh. Third Edition. Pp. 207. (London, Ridgway.)—The third edition of this seasonable book is well timed. We have frequently noticed its merits, and can only reiterate our praise of its plain and concise instructions to sportsmen in pursuit of grouse, partridges, &c.

Reports of Lectures delivered at the Chapel in South Place, Finsbury, by W. J. Fox. Pp. 56. (London, Fox.)—A sharp critique upon the coronation ceremonies, and the sermon of the Bishop of London on that occasion. Mr. Fox is well known as a man of great talent, peculiar secular opinions, a shrewd mind, and an able pen. All are evident in this pamphlet. Many of the remarks are acute and forcible; some are tortuous and misapprehensive; and the same measure applies to the reasoning or argument, some of which is irrefragable, and some either singularly illogical, or raised on mistaken, we would not say misrepresented, grounds. The whole deserves perusal with a clear and well fortified understanding.

The Guide to Service; the Maid of all Work. Pp. 72. (London, Knight.)—When maids of all work take to reading all works, and not novels only, they will find good advice in these pages for the performance of their multifarious duties. The winding-up is, however, very grandiloquent. "There is no situation in life, perhaps," (says the writer, and the 'perhaps' is not out of place, whatever the idea, or the maid to whom it is addressed, may be) there is no situation in life which affords more occasion for acting nobly. There is no day in your life when you may not show yourself generous, forbearing, and cheerfully industrious; and to be so is to be truly great. There is a glory (quære, warning-pan?) in your lot, if you bring to it a noble mind of your own. If you clearly see this, I wish you joy." And well you may, if any maid of all work in Great Britain does clearly see the nobility and glory of her rubbing, scrubbing, and grubbing occupations from morning even unto night!

ARTS AND SCIENCES.

HORTICULTURAL SOCIETY.

At the meeting, on Tuesday, the Banksian medal was awarded to Mr. Pratt, for his pretty

collection of *Ericas* (heaths). Silver medals were awarded to Mr. Paul, for a splendid collection of roses; to Messrs. Rollinson and Sons, for *Lilium speciosum*; and another Banksian medal to Mr. Breeze, for a noble specimen of the Muscat grape. A fine collection of fruits and flowers were exhibited; the excellence of the former was tested (tasted) by the company, and Professor Lindley gave a brief, but satisfactory, description of the various specimens. The collection of flowers, especially dahlias and roses, was exceedingly beautiful. Amongst the fruits was an enormous cucumber, of seven days' growth, which measured nearly two feet in length.

FINE ARTS.

THE GARDEN OF EDEN. BY J. R. WALKER.

WE have availed ourselves of the opportunity of an invitation from the artist to a view of his performance. The Garden of Eden is a subject well calculated to tax the powers of the painter and the pen of the writer to their utmost extent. Presented to the imagination only, it becomes invested with all the charms of the ideal, seldom found in the embodied forms, however beautiful. Milton's description of the beauties of Paradise is said to have been derived from the Italian poets, Ariosto and Tasso; the Garden of Alivia by the first, that of Armida by the latter. Be this as it may, in such poetical scenes the reader must paint for himself, and his picture will become the work of his own fancy: not so the artist, whatever his composition may be, his prototypes must be found in nature; and in this instance Mr. Walker has acquitted himself with great skill, as well in the technical, as in the poetical character of his subject; in it we recognise an assemblage of the most beautiful forms, as well as colours; and, as a whole, a splendid example of the elevated and sublime in landscape composition. The picture is of great extent, and may be said to bring all Paradise into view; the freshness of the morning is on the scene, and the figures of our first parents are represented as bending in their orisons before their great Creator. From all that we can judge of this performance, in the studio of the artist, it does great credit to his talents, as well as to the school of the country.

NEW PUBLICATIONS.

Portrait of Count Alfred D'Orsay. Engraved from a Painting by F. Grant, by F. G. Lewis. London: Mitchell.

PERHAPS more splendid examples of man and horse could hardly be found, characteristic of ease, elegance, and fair proportion belonging to both; and if, instead of the modern portrait and costume, it had appeared as a belted knight or hero of romance, we should be inclined to apply the line of a song, which says, "Then, ladies, beware of a gay young knight, who loves and he rides away." There is, however, sufficient interest as it appears in its equestrian character.

ORIGINAL POETRY.

SONNET:

Addressed to the Author of "Jon," and the "Athenian Captive."

IN these degenerate days, when Tragedy,
That erst with high coturn and flowing pall
In lordly majesty came sweeping by—
Reft of her sceptre, drooped beneath the thrall
Of ribald Fantomime and senseless show;
The Muses, Talfourd, did assign to thee
The glorious task to vindicate below
Their much-wronged sister, fair Melpomene.

By thee, once more re-seated on her throne,
In all her pristine dignity she reigns;
While thou attendant at her side dost stand,
Thy shell inwreathed with myrtle in thine hand;
Whence ever and anon proceed such strains
As Pella's bard had not disdained to own.

Pembroke College, Oxford, August 5.

R. B. S.

DRAMA.

Her Majesty's Theatre closed on Saturday, after a brilliant and prosperous season. Old and favourite operas have been frequently played, and three new ones, successfully produced, have also been fairly brought before the public. Several valuable additions have been made to the excellent company: Madame Persiani has established herself as a first singer; Signori Tati and Morelli, and Mlle. Caremoli, have done justice to second-rate parts in many operas. The ballet has not been so constantly well filled, but we have had Taglioni, Fanny and Terese Elsler, as stars, and some pretty and graceful girls in the intervals: also some three or four gentlemen, who danced and jumped through the season with much activity.

Drury Lane.—Madame Albertazzi took a benefit at this theatre on Monday, when the public shewed their appreciation of her talents by flocking to Drury Lane, which was literally crammed. The only novelties were her own appearance in an English opera, in which she succeeded, and that of a Master De Koutski, a youth of about twelve years old, and one of the most extraordinary violinists we have ever heard. He played a beautiful composition of De Beriot, and one of his own, in both of which he was rapturously applauded; in fact, notwithstanding the still-felt influence of Paganini and Ole Bull, we think this young gentleman is likely to create a great sensation in the musical world, for it is very seldom that one so young has such complete command over his instrument.

Haymarket.—On Tuesday, Mr. Walter Lacy made his first appearance in the character of *Charles Surface*, in *The School for Scandal*. He possesses a good person and an agreeable and well-modulated voice, together with considerable spirit and buoyancy. We make all due allowance for the nervousness of a first night, and, therefore, only slightly mention faults while we give our full praise to the merits of a young actor. Mr. Lacy's manner is somewhat too hurried, and he does not give time for either himself or others to make "a point;" nor does he throw quite enough of the gentleman into the early scenes. In some of the graver portions of the comedy he seems more at home, and it is evident that a little cultivation and confidence will render him an exceedingly pleasant actor, either in genteel comedy or, we venture to think, domestic drama.

Several American gentlemen have brought to this country two trained (male and female) lions, and a like number of leopards and tigers. The animals are in fine condition: the lions, especially, are, perhaps, the most magnificent specimens ever exhibited in Europe. On Thursday, a number of distinguished individuals were invited to a private view of these extraordinary animals, at Astley's Theatre, where they are to make their appearance, in the course of next week, in a zoological spectacle, called, *The Lion-Quarrelor of Pompeii*.

VARIETIES.

Newcastle. — On Monday evening no fewer

than 2059 members of the British Association were enrolled, being 219 more than the closing number at Liverpool; the largest previously attained at any meeting.

Spooner's Panoramic View of the State Procession of Queen Victoria to Westminster Abbey.—Under this long title we have a long view of the coronation procession from Buckingham Palace to Westminster, which not only gives the carriages, horses, &c., but also most of the principal buildings on the line. Though not particularly well executed, it will afford a tolerably faithful idea of this grand sight to those who, from distance and other causes, were not able to witness the real thing.

Roman Antiquities.—A large basso-relievo has recently been found in the foundation of an ancient tower near the Porta Maggiore, at Rome, which represents a Roman bakehouse, with all the operations of bread-baking. "Galligani's Messenger" also states, that the great aqueduct of Claudius is being cleared out with much activity.

The Stranger's Guide to London, another little periodical miscellany (No. 1.), has just appeared; and, besides customary features of amusement and information, founds itself on the peculiarity of furnishing, from week to week, a notice of and guide to the principal sights of London.

LITERARY NOVELTIES.

The Rev. J. M. Cramp is preparing a new and enlarged edition of his "Text-Book of Popery."

LIST OF NEW BOOKS.

Complete English-Latin Dictionary, by the Rev. J. E. Riddle, M.A. 8vo. 10s. 6d. — Irish Melodies, by T. Moore, Esq. with an Appendix, thirteenth edition, fcap. 10s. — Conversations for Children on Land and Water, by Mrs. Marcet, fcap. 5s. 6d. — Strictures on the Life of William Wilberforce, by Thomas Clarkson, M.A. 8vo. 5s. — Chemistry of Organic Bodies, by T. Thompson, M.D. 8vo. 24s. — Millenarianism Unscriptural, or a Glance of the Consequences of that Theory, 12mo. 5s. — Letters on Paraguay, by J. P. and W. P. Robertson, 2 vols. post 8vo. 21s. — Letters on Egypt, Edom, and the Holy Land, by Lord Lindsay, 2 vols. 8vo. 24s. — Memoirs of Monk, Duke of Albemarle, from the French of Guizot, by the Hon. J. S. Wortley, 8vo. 12s. — Memoirs of Mrs. Louisa A. Lowrie, of the Northern Indian Mission, 18mo. 3s. 6d. — An Act to Abolish Arrest for Debt, fcap. 2s. — A Romance of Vienna, by Mrs. Trollope, 3 vols. post 8vo. 11s. 6d. — Chitty's Precedents in Pleading, complete 1 vol. royal 8vo. 11s. 6d. — Ditto, ditto, Part II. royal 8vo. 10s. — On the Law of Disputations and Nuisances, by D. Gibbons, 8vo. 9s. — Perspective Simplified, by T. Lawrence, 8vo. 7s. — Rev. A. Cissold's Letter to the Archbishop of Dublin, on Swedenborg's Writings, 8vo. 7s. — De Porquet's Petit Vocabulaire and French Gender, fcap. 2s. 6d. — English History Tables, by C. H. Bateman, oblong folio, 3s. 6d. — The Zoological Garden, with fifty-three illustrations, 18mo. 3s. 6d. — Riddle's English-Latin and Latin-English Dictionary, complete in one vol. 8vo. 11s. 6d.

METEOROLOGICAL JOURNAL, 1836.

August.	Thermometer.	Barometer.
Thursday... 16	From 40 to 70	30.06 — 30.90
Friday... 17	... 53 .. 67	30.07 .. 30.10
Saturday... 18	... 52 .. 71	30.14 .. 30.12
Sunday... 19	... 52 .. 74	29.96 .. 29.60
Monday... 20	... 48 .. 67	29.77 .. 29.55
Tuesday... 21	... 56 .. 69	29.34 .. 29.33
Wednesday 22	... 52 .. 65	29.34 .. 29.22

Winds, S.W.

Except the 18th, and afternoon of the 20th, generally cloudy, with frequent and heavy showers of rain.

Rain fallen, .275 of an inch.

Edmonton.

CHARLES HENRY ADAMS.

Latitude... 51° 37' 38" N.

Longitude... 3 51 W. of Greenwich.

TO CORRESPONDENTS.

To Correspondents, &c. — At this season of the year it is most expedient that all communications for the *Literary Gazette* should be sent as early as possible in the week.

We have paid every attention to the letter from "The Author of a Vindication of the Book of Genesis," and are sorry we cannot make our opinion coincide better with his own: this, however, is impossible; and we have neither time nor space to discuss points of theology with him.

ADVERTISEMENTS, Connected with Literature and the Arts.

UNIVERSITY OF LONDON.

Notice is hereby Given, that on Wednesday, the 9th of September, the Senate of this University will proceed to elect, Two Examiners in Mathematics and Natural Philosophy; One Examiner in the French Language; and One Examiner in the German Language. These Examiners will conduct the Matriculation Examinations, and the Examinations for the Degrees of B.A. and M.A. They will continue in office for one year from the time of their appointment.

The Examiners in Mathematics and Natural Philosophy will receive 200l. each from the University Chest. The Examiners in French and German will receive 20l. each, for each Examination.

Further Particulars may be learned by application to the Registrar at Somerset House.

By Order, R. W. ROTHMAN, Registrar.

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The Lectures for the Season will commence on Monday, September 3d, with a Course on Hydrostatics, by Mr. Adams. To these will succeed Lectures on the minor Poets, by Mr. Cowden Clarke, and on Music by Mr. Holmes.

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